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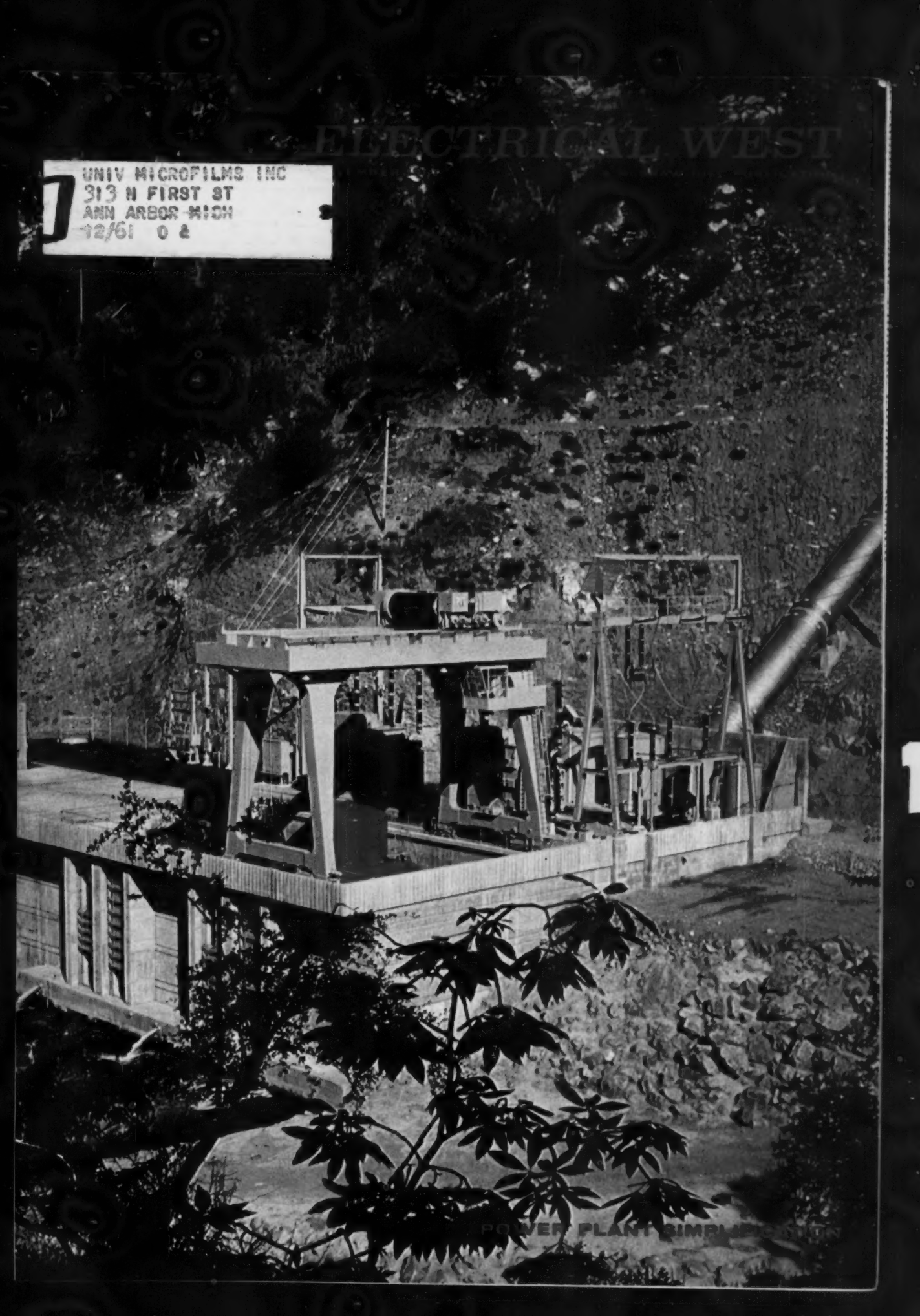


Strandvise® alone

has these straight-down-the-line abilities

FEED-THRU *ability*

Nothing approaches the value and ease of the feed-thru mechanical chuck for placing and tensioning a guy. Use no tensioning tools until after the guy is in place. Then each click of the hoist feeds strand thru the chuck to desired tension.

ONE-MAN *ability*

A one man "crew" can complete a down guy easier, faster and safer than with any other method. Strandvise is a "natural" even for EHS strand.

USE *ability*

No precision pre-cutting. No markers to locate and line up. No size color codes to remember.

NO-CORRODE *ability*

External—Tube and yoke are each a homogeneous aluminum alloy. There is no coating . . . scratching or abrasion cannot initiate corrosion.

Internal—Both laboratory tests and field service exposure (natural cycling) have repeatedly failed to show evidence of corrosive attack on strand within the gripping area. Tapers and initial tension wedge and seal that area.

RE-USE *ability*

Strandvise is wholly reusable; once, twice, or a dozen times.

ADJUST *ability*

Luck plays no part during the tensioning operation. Strandvise "swallows" strand with each click of the hoist—Tension is a fact.

NO-ABRASION *ability*

The stainless steel bail has no peers. There is no coating to abrade away. 18-8 stainless steel will never rust or deteriorate in any known corrosive atmosphere.

REACH *ability*

The overall length of Strandvise averages less than 12 inches for most sizes.

SAFE *ability*

No need to remove come-along or hoist to gain working space before the job is completed. With Strandvise the load is always captive.

NATURAL *ability*

Nothing to study—nothing to avoid—nothing to ("look-out!") for—wholly safe to install without safety glasses and gloves (where regulations permit).

NO-FOUL-UP *ability*

The only wire is the guy wire. The only ingenuity called for is already built into Strandvise.

PROCEDURE *ability*

Give or take guess work is no part of Strandvise—nothing to get ready, nothing to allow for. (Stainless bail cannot stretch.)

MULTIPLE GUY *ability*

Double and triple guying to one guy rod presents no working space problems with Strandvise.

TAMPER-PROOF *ability*

Mischievous release is impossible unless the "villain" has a hoist and come-along.

COST *ability*

You can use every Strandvise you buy . . . none are rendered useless by storage or handling damage, or by field mistakes.

Installed costs favor Strandvise all the way. One man for five minutes is all the "help" Strandvise needs for a *completed* down guy.

HOLDING *ability*

Forged and case hardened chucks are quality controlled at factory and are consistent by nature of design and tooling. No grit or combination of coatings to be controlled and trusted.

During 27 years of continuing production, it has never been reported that a Reliable Feed-Thru Deadend Chuck let go a line. (Strandvise is in its twelfth year of production.)

Reliable

A Symbol of Integrity Since 1909

RELIABLE ELECTRIC COMPANY

Franklin Park, Illinois

Inflation—The Pickpocket

In the last article of this series we discussed the destructive effects of excessive taxation on the economy in general and on our own personal pocketbooks. A still more insidious drain on our individual and collective resources is the persistent inflationary trend that stems directly from unsound management of the country's money.

The dictionary defines inflation as an increase in the quantity of money or credit or both relative to the goods available for purchase. Inflation always produces a rise in the price level. How does this rise in the quantity of money or credit come about?

Many factors contribute to an inflationary spiral in the economy. Wage increases that do not reflect an equivalent increase in productivity is one. Overexpansion of credit is another. One of the most powerful is the management of government debt.

Not content with taking one-third of the country's total income for its operation, the government, through our elected representatives, is being given so many things to do that it cannot live within its income (tax take). Even though the government is operating in red ink, it still must have dollars to pay salaries of the bureaucrats and the contractors from which it buys. Unfortunately, the government is not like the rest of us because it has the power to create credit or even print paper dollars. In short, the government adds to the money supply without significantly adding to the real output of products produced by the economic machine. Thus, there are literally more dollars in circulation to buy a given physical output of products. The net result is that it takes more dollar units to buy any given item available—and prices go up.

Historically the physical output of goods and products by the country's economic machine has increased faster than the money in circulation with the result that prices either came down or that more people were able to satisfy their desires for more things. This was the basis of America's rapid improvement in its standard of living.

Since 1932 the federal budget has been chronically in red ink. Of course, during World War II and Korea the deficit skyrocketed until today the national debt is nearly $300 billion. Total debt approximates $550 billion.

While the relationship between the money supply and the output of goods and services is extremely complex, we as individuals are interested only in the net results. Deficit financing has so eroded the purchasing power of the American dollar that it now will buy only half as much food, clothing or any other item you care to name (except electricity) as it did back in 1939. If deficit spending continues, the purchasing power of the dollar will continue to melt away.

This should be a source of considerable concern for every employed person. Wages and salaries for the most part do not increase as fast as prices. This results in a reduction in real purchasing power for each and every one of us. More important still, the payments which we expect in the future such as those for retirement income from insurance annuities and social security could become meaningless as a source of providing food and shelter during our old age.

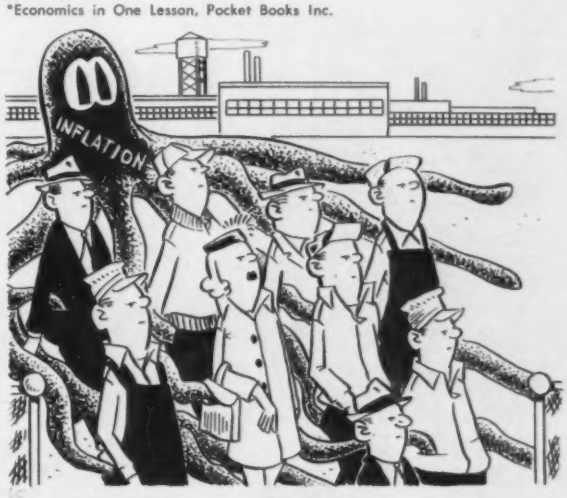
Henry Hazlitt,* the economics writer, calls inflation the hidden tax not only on personal expenditures but on savings account and life insurance. He condemns it in these forceful words:

"It discourages all prudence and thrift. It encourages squandering, gambling, reckless waste of all kinds. It often makes it more profitable to speculate than to produce. Its inexcusable injustices drive men toward desperate remedies. It plants the seeds of fascism and communism. It leads men to demand totalitarian controls. It ends invariably in bitter disillusion and collapse."

Inflationary forces are still with us. This last Congress, for example, voted to spend $10 billion more than the government will collect in taxes in the next fiscal year. The ceaseless round of wage increases (and higher prices) continues. All of us will be the unwitting and unwilling victims, faced with a progressively lower standard of living, unless we make a concerted effort to stop deficit spending of money and resources in every phase of the economy. Only we can force our elected representatives to stop buying votes with unneeded expenditures of our own future earnings. Only we can speak out for moderation in wage demands. Only we can up productivity by not only doing our own jobs efficiently but also by standing firm against "feather-bedding" tactics that add fuel to the inflationary boiler.

Unless some restraint is consciously applied by the electorate, it's not hard to predict that some morning in the not-too-distant future you and I will wake up broke, working for a bankrupt company in a pauper nation.

*Economics in One Lesson, Pocket Books Inc.



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CONTENTS

VOL. 127, NO. 5 NOVEMBER 1961

Plant Simplification by A. B. Christie 59

12-Kv Residential Underground Systems by J. H. Lawson 62

Expedient Reinsulation by W. H. Handley and D. E. Pike 65

NELPA Looks for the Challenges 68

The Future Demands Salesmanship 70

National Power Conference 75

Inspectors Tackle Next Code 78

EASA Turns to Management 84

DEPARTMENTS

Contracting and Construction 77

Editorials 1, 58

Manufacturers Literature 93

Letters to the Editor 6

Meetings Calendar 6

News 30

Product News 87

Advertising Index 100

Cover: Southern California Edison Co.'s Mammoth Pool project. See story p 59.

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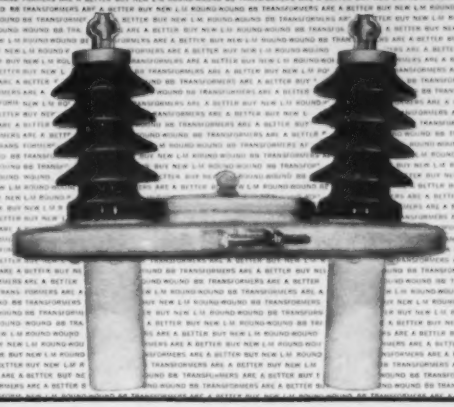

NEW connectors on cover bushings, with larger openings, for both copper and aluminum conductors

NEW 2-piece band cover closures

NEW 1-bolt hand-hole covers

NEW all-Levroc covers

NEW internally clamped bushings

NEW lifting lugs

NEW Duralem insulation

NEW lower total losses

NEW lighter weight

NEW smaller size

THE REVOLUTIONARY NEW ROUND-WOUND TRANSFORMER with new Duralem insulation offers many remarkable improvements — smaller size, lower losses, assurance of long life. Duralem insulation is a new, thoroughly tested development of the Thomas A. Edison laboratories of McGraw-Edison Company in cooperation with L-M Transformer engineers.

New Round-Wound® BB Transformer Has Duralem(tm) High-Temperature Insulation

For several years Line Material Transformer designers have been working on the development of a new Round-Wound transformer that takes even greater advantage of the exceptional cooling of the Round-Wound design.

Exceptionally Good Cooling

Because the two round coils provide greater exposure of windings to cooling oil, the Round-Wound design has always resulted in significantly lower hottest-spot temperatures, and lower average copper temperatures, thus creating the lowest temperature gradient in the industry.

As the development of Duralem insulation progressed, it became evident that the new transformer could take even greater advantage of the Round-Wound cooling system by using this newly developed high-temperature insulation.

The result of the design changes and the use of the Duralem insulation is a new transformer that is shorter (38" high for the 25 kva, 7200 volt unit as against 45"), and appreciably lighter.

Lower Overall Losses

Losses have been reduced substantially—as much as 16% in some ratings. In addition, many improvements in mechanical features will contribute to performance, convenience, life, and ease of installation.

The new transformer will be available shortly in 10, 15, and 25 kva ratings; additional sizes will be released very soon.

Get Complete Information

Ask the L-M Field Engineer for details on this remarkable new Round-Wound BB Transformer and a copy of the AIEE paper on Duralem insulation; or write Line Material Industries, Milwaukee 1, Wis.

THE NEW L-M-EXCLUSIVE SRT transformer will also embody all the many improvements of the conventional Round-Wound transformer. Ask the L-M Field Engineer for complete information on the SRT®

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McGRAW-EDISON COMPANY

542

Distribution Transformers

McGRAW EDISON

DISTRIBUTION TRANSFORMERS · RECLOSERS, SECTIONALIZERS AND OIL SWITCHES · FUSE CUTOUTS AND FUSE LINKS · LIGHTNING ARRESTERS · POWER SWITCHING EQUIPMENT
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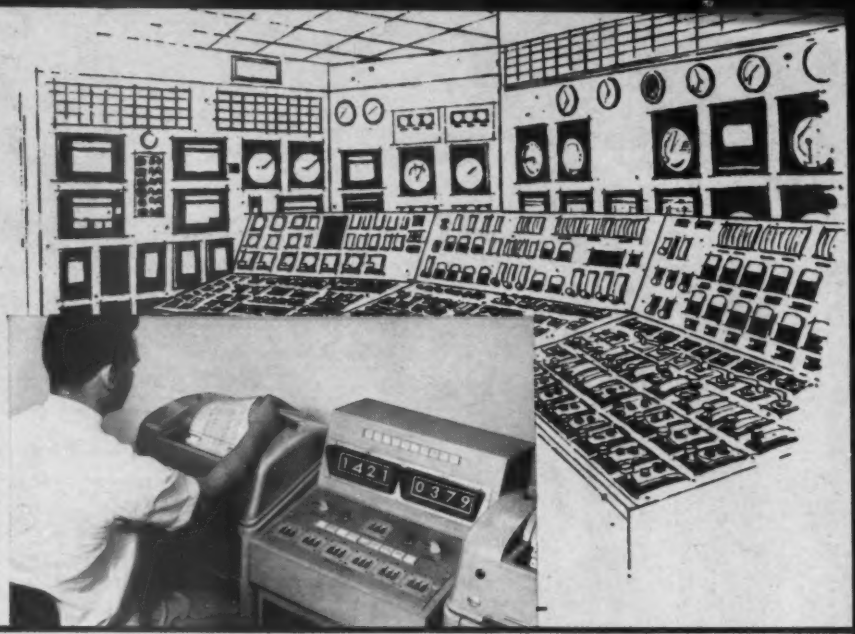
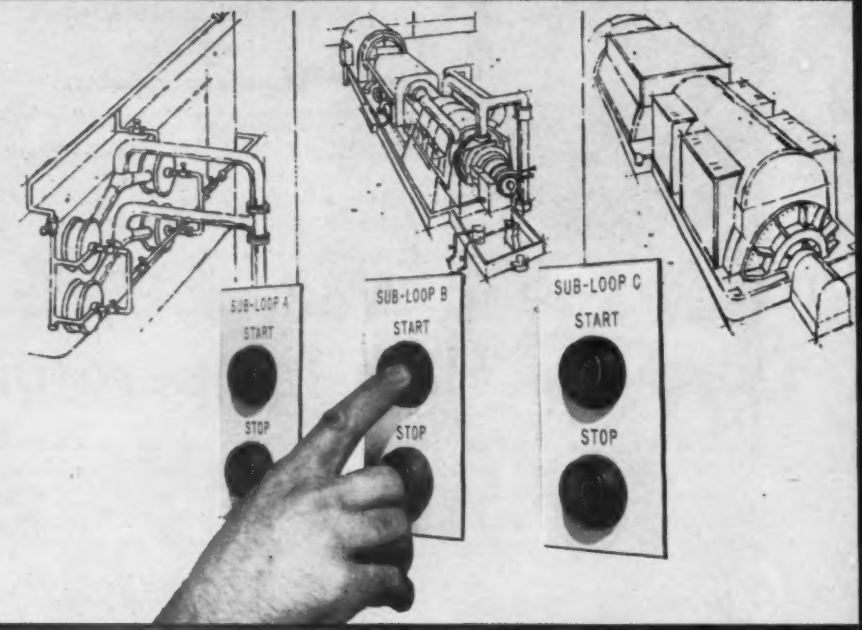
FIRST SIMPLIFY...

First step to automation is to *simplify* the information now presented by a multitude of multi-record charts, gages, and annunciator lights. The Bailey approach gives the operator data he needs (logged periodically), keeps continuous watch on all variables, makes calculations where required, alarms when trouble threatens. Reliability of recorded data is increased . . . operators can devote full attention to correcting off-normal conditions and improving operations.



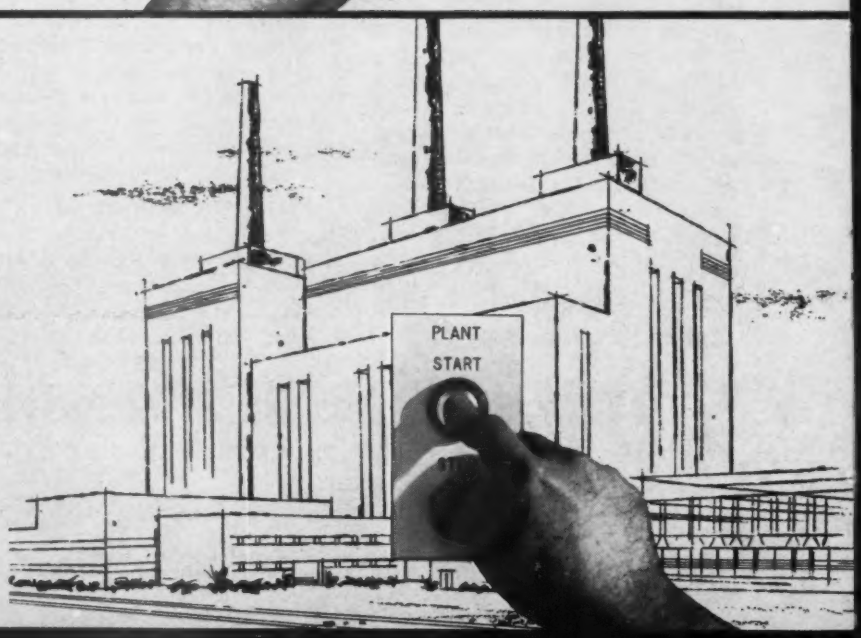
NEXT VERIFY...

Next, verify the practicability of automation by extending supervisory controls, letting equipment perform more operating functions. Automate key systems, one at a time, by push-button controlled sub-loops. This approach smooths the transition to complete automation and improves safety to men and machinery by providing safe, uniform start-up, shut-down, and normal operating procedures.



THEN AUTOMATE

Final steps to automation can then be made at any time with full confidence and proved operational experience. These steps are: 1) to consolidate supervisory controls, conventional controls, and sub-loops for full-range automatic operation once the plant has been placed on the line; and 2) ultimately, to add start-stop control to provide full automation.



How to get *assured results* from AUTOMATION

...and gain as you go

Complete automation is a long step forward — with many challenges along the way.

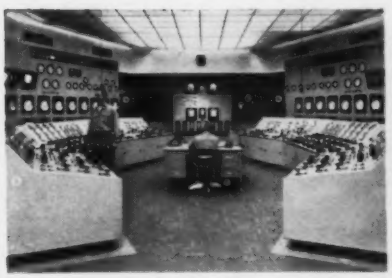
The Bailey step-by-step approach to automation makes possible step-by-step certainty ... provides step-by-step benefits ... requires only step-by-step commitment.

In the initial steps it makes possible many or most of the benefits of complete automation with considerably less investment than required for the ultimate. And it permits the decision to take each succeeding step to be made only after satisfactory evidence that it is economically justified and functionally sound.

Bailey 700 Systems draw on the best available techniques, including analog and digital manipulation, trend recording, time sharing, scanning, alarming, calculating, controlling, and logging, as required to meet operating objectives. Individual systems, including logic and sequence units, are coordinated by Bailey's distinctive method of *parallel programming* to achieve plant automation. The parallel-programming approach improves plant availability by making it practical to remove individual systems from service or reprogram without disturbing operation.

Ask your Bailey District Office, or write for more information on the Bailey step-by-step approach to automation with Bailey 700 Systems. Bailey Meter Company, 1062 Ivanhoe Road, Cleveland 10, Ohio. In Canada —Bailey Meter Company Limited, Montreal.

Bailey Systems Concepts are Founded on 45 years of Experience



Twenty-one of the twenty-six most efficient steam-electric stations in the United States use Bailey Instruments and Controls.* This reflects more than 45 years of Bailey developments devoted to improving the reliability of power-plant operation. **Listed in Federal Power Commission Report S-143.*

Bailey experience in automation dates from electrically operated boiler controls in 1924, automatic start of boiler controls on steam-electric locomotive in 1936, and fully automated package boilers in 1948. This Bailey 750 System for simplified display of power-plant operating information was installed in 1959.

Bailey experience extends to and includes the atomic power field. In the completion of the Enrico Fermi Atomic Power Plant at Monroe, Mich. in 1961, Bailey Meter Company was prime instrument contractor, supplying both pneumatic and transistorized electronic control systems. A165-2

BAILEY METER 700 SYSTEMS

BAILEY METER COMPANY

700 Systems

For phone number of closest representative see advertising index in back of book.

AVAILABLE NOW FROM SANGAMO...

the smallest, lightest potential transformer of its kind

T-6

First the BH-6 current transformer . . . and now, a companion potential transformer—the T-6. Compact, epoxy-molded and encapsulated for indoor-outdoor 600 volt class service. Accuracy classification is 0.3 at W and X burdens; actually, the design allows 0.3 accuracy for burdens of two watthour meters, phase-shifting transformer, and demand register (approximately 35 volt amperes).

Impulse level of the T-6 is well in excess of 10 kv full wave, yet it weighs less than 14½ pounds. Liberal cross-section in the secondary winding accounts for a thermal burden rating of 500 volt amperes at 30°C ambient.

The T-6 is small. It measures only 5¾" x 5¼" x 4½". Standard ratios are completely color-coded as follows: 2:1, red, 2.5:1, yellow, 4:1, blue, 5:1, gray. It's built to last, too . . . right down to its alondined and painted aluminum base. Naturally, it meets all of the applicable NEMA standards for indoor transformers of the 600 volt class.

Our suggestion: check full particulars of the T-6 with your Sangamo Representative.

Sangamo BH-6 current transformers lead their class, too. Use them . . . take full advantage of their dual-range feature (a Sangamo first). Eliminate transformer changeouts due to load growth.

BH-6 transformers are epoxy-molded, color-coded, completely encapsulated, lightweight. Large conductor goes through that *Big Hole* easily. Available for all indoor or outdoor applications in a rating for your specific need.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

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LETTERS

To the Editor:

The September issue of ELECTRICAL WEST gave such an excellent and comprehensive treatment of the present status of the nuclear power industry that I passed it on to Mary's physics instructor at the local high school. He was so impressed with it that he asked me if I could obtain a dozen copies for his use with his classes. So far, I have only been able to pick up two copies in the offices and I am wondering if you could supply the other ten for me. I will be glad to send you a check for them if you will let me know the amount . . .

Fred Oldendorf Jr.
California Electric Power Co.
San Bernardino, Calif.

Editor's Note: Because of the demand for this issue, we are sold out. Would any reader who is through with his copy like to help out Fred Oldendorf?

To the Editor:

. . . While we certainly appreciate your excellent coverage of the current nuclear scene, we thought you would like to have this information about the graph on p 79.

The bar for organic power reactors should have included the following projects under "reactors planned or under construction":

	Mw (e)
Piqua Nuclear Power Facility	11.4
Prototype Organic Power Reactor	50.0
Baden Wurttemberg Nuclear Power Plant Planning Assn. (KBWP)	150.0
Total	211.4

. . . These projects and studies, plus the work done here and abroad in developing organic reactors for maritime propulsion, provide a sound technological foundation for this reactor concept.

Your continued interest in Atomics International and our project is appreciated.

Richard E. Jespersen
Atomics International Division
North American Aviation Inc.

Meetings Calendar

NOVEMBER

6—*American Institute of Electrical Engineers*, Los Angeles Section, third Western technical conference, Biltmore Hotel, Los Angeles.

24-29—*Electrical & Home Appliance Show*, Balboa Park, San Diego.

27-28—*Pacific Coast Electrical Assn.*, Administrative Services Section, fall conference, Miramar Hotel, Santa Barbara, Calif.

DECEMBER

7-8—*Washington Public Utility Districts Assn.*, annual meeting, New Washington Hotel, Seattle.

JANUARY 1962

14-19—*Los Angeles Winter Market.*

18-19—*Public Utilities Advertising Assn.*, Region 9 meeting, Palm Springs, Calif.

22-26—*San Francisco Market*, Western Merchandise Mart.

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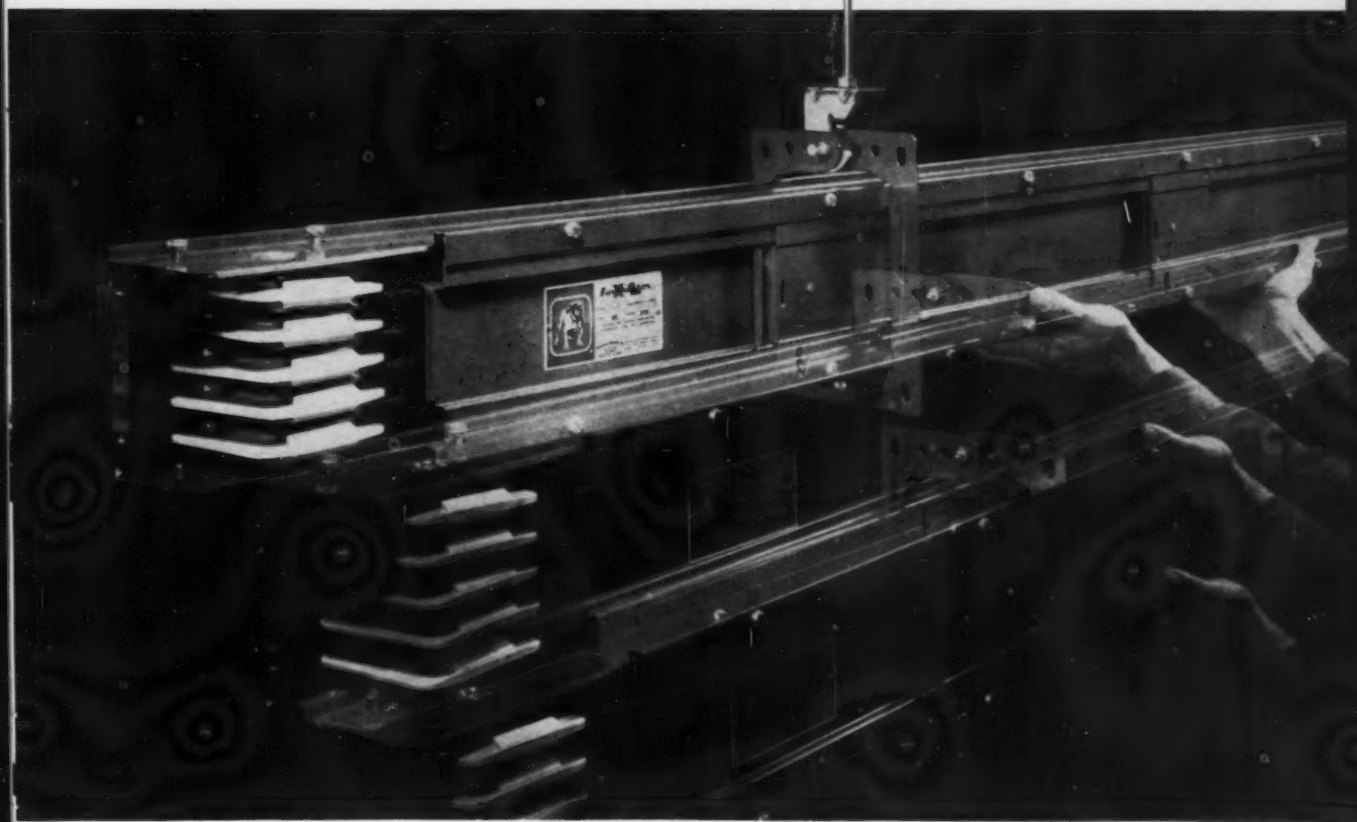
This symbol stands for bus duct

This symbol stands for QUALITY

NOW... BullDog plug-in duct hangs up to 50% faster

with new HANGFAST Adapter

New HANGFAST Adapter bolts quickly and tightly to suspension rod end . . . duct with standard hanger engages HANGFAST Adapter hook instantly . . . hanger bolt spins tight fast for a lasting, secure installation. Result—you can save as much as 50% in hanging time . . . end time-consuming bracket fabrication, too! And you can use the new HANGFAST Adapter with all types of BullDog industrial plug-in duct systems—XL, BD and LO-X®. Ask your BullDog Field Representative for a demonstration. Or write for details.



BullDog Electric Products Division, I-T-E Circuit Breaker Company, Box 177, Detroit 32, Mich. In Canada: 80 Clayson Rd., Toronto, Ont. Export Division: 13 East 40th St. New York 16, N.Y.

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Safety Switchboard Company
910-89th Avenue
Oakland 21, California

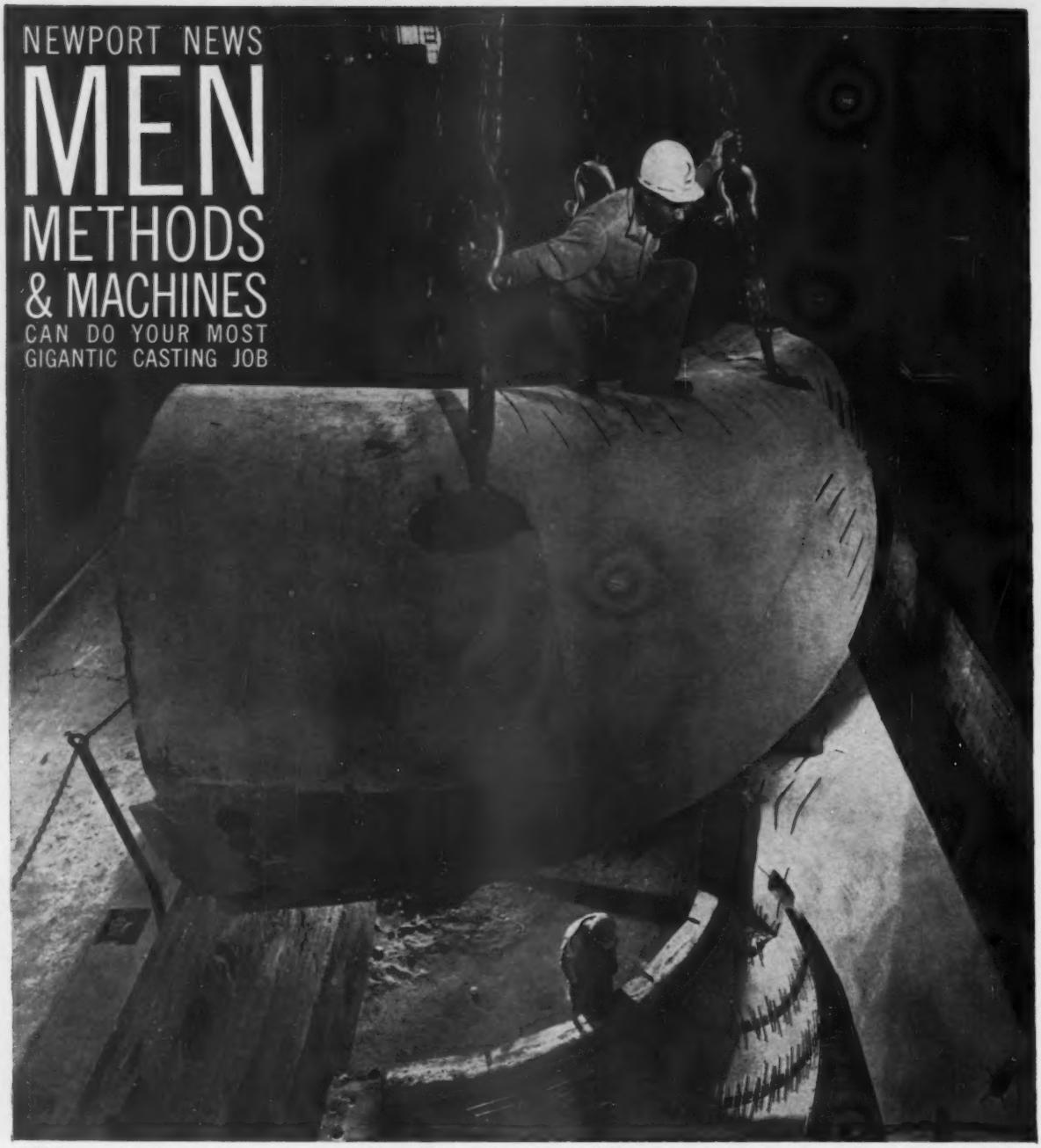
BullDog Elec. Prod. Co. of Los Angeles
3020 Supply Ave.
Los Angeles 22, California

I-T-E CIRCUIT BREAKER COMPANY
BULLDOG ELECTRIC PRODUCTS DIVISION

NEWPORT NEWS

MEN METHODS & MACHINES

CAN DO YOUR MOST GIGANTIC CASTING JOB



Mold for a section of a turbine stay ring for the Hartwell Power Plant. It is the largest one-piece Y-casting ever produced by Newport News.

It takes all three—men, methods and machines to tackle a job as big as this one! Newport News has completed many of them including six hydraulic turbines for the Niagara Project, four for the Hartwell Power Plant, and many others.

Newport News not only cast this giant unit but also milled it—and built the boring mill that did the work! No challenge is too great.

The secret of its leadership in the fabrication of heavy equipment is its staff of highly trained engineers and technicians, thousands of skilled workmen and 225 acre plant capable of turning out such projects as hydraulic turbines and valves, vacuum or pressure vessels for the petrochemical industry, bridge caissons, wind tunnels, and pulp and paper equipment.

Consult Newport News for preliminary recommendations at no obligation.

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SHIPBUILDING AND DRY DOCK CO.
NEWPORT NEWS, VIRGINIA

FRESH CARTRIDGE FIBER ON EACH OPERATION...

guarantees positive

"INTERRUPT-ABILITY"

of Kearney

TRIP-O-LINK CUTOUTS

Kearney Trip-O-Link Cutouts entirely eliminate the possibility of failure due to charred or eroded fiber which can occur in open type cutouts. Trip-O-Links are re-fused after each interruption with a single, inexpensive unit combining both new fuse element and new cartridge lined with fresh, arc-quenching fiber. As a result, you can rely on Trip-O-Link cutouts to clear maximum fault current ratings in one cycle or less... regardless of the number of operations or length of time in service.

Closed cartridge ends prevent entrance of dust, insects or foreign matter. Single-unit fuse and cartridge can be inserted with one, simple hook-stick operation... making Trip-O-Link the easiest of all cutouts to re-fuse. Exclusive spring action contacts permit fuse link cable to be easily inserted without strand damage, yet exert strong wedging force to maintain constant high pressure contact.

Contact arms flex **with** the force of impact, absorb shock to prevent insulator damage. Double-coiled spring action of lower contact arm pulls link end out of and away from the cartridge... creates a long air gap to eliminate danger of restrike. Available in 50 ampere continuous ratings for 5.2 KV, 7.8 KV and 15 KV; also for substation and feeder protection to 69 KV and 100 amperes.

For complete information, contact your Kearney Sales Representative

516

KEARNEY

for better construction... safer maintenance... specify KEARNEY products

JAMES R. KEARNEY CORPORATION

4224-42 Clayton Avenue • St. Louis 10, Missouri

PLANTS AT: ST. LOUIS • MELROSE PARK, ILLINOIS • FAYETTEVILLE, ARKANSAS • GUELPH, ONTARIO, CANADA • ST. THERESE, QUEBEC, CANADA

For phone number of closest representative see advertising index in back of book.

HILLER 12E
N53

From Crossarms to Complete Towers...

Alcoa® Aluminum. Dropped from the air or built straight up. ■ Designed and fabricated by Alcoa Structural Division for economy — speed — strength.

Write:
Aluminum Company of America
Structural Division
873-L Alcoa Building
Pittsburgh 19,
Pennsylvania

ALCOA ALUMINUM

STRUCTURAL DIVISION

Entertainment at Its Best . . . ALCOA PREMIERE
with Fred Astaire as Host . . . Tuesday Evenings, ABC-TV

Again, Lapp leads the way to help you increase substation efficiency . . . to reduce construction and maintenance costs.

Here is Lapp ***Hi-F***—in Station Posts—a new, but fully-accredited member of the Lapp family of Station Posts. ***Hi-F*** adds another "strength class" to the Lapp Station Post series, and is offered as a realistic 1961 answer to a majority of substation insulator operating requirements.

You see, it has been 30 years since Lapp introduced the Station Post design with all its improvements over conventional cap-and-pin station insulators. In the beginning, and to answer expected skepticism in the field regarding such a "revolutionary new design," we rated the original Lapp Station Posts conservatively—providing generous factors of safety in all mechanical values.

In the 30 years since, physical dimensions of Lapp Posts have been changed little. Materials and manufacturing techniques have been improved notably, however, with resulting increases in test characteristics and uniformity. Today standard-strength Lapp Station Posts qualify as substantial "over-design" in most applications for which they are used.

In the new series of Lapp ***Hi-F*** Station Posts, each unit—7.5 kv through 69 kv—is rated at 1,000-lbs. cantilever (both in upright and underhung positions), a strength adequate for almost all present substation use. In electrical ratings ***Hi-F*** matches EEI-NEMA values for standard Station Posts, and ***Hi-F*** is physically interchangeable with standard Station Posts. For application under high short-circuit stress or other requirement for higher cantilever, we still offer Lapp Station Posts in standard, high-strength, and extra-high-strength types, with strengths respectively of 2,000, 4,000 and 8,000 lbs.

Lapp's contribution in ***Hi-F*** Station Posts is that of providing *another* station insulator choice—to help you specify what you need, and pay only for what you can use.

Lapp

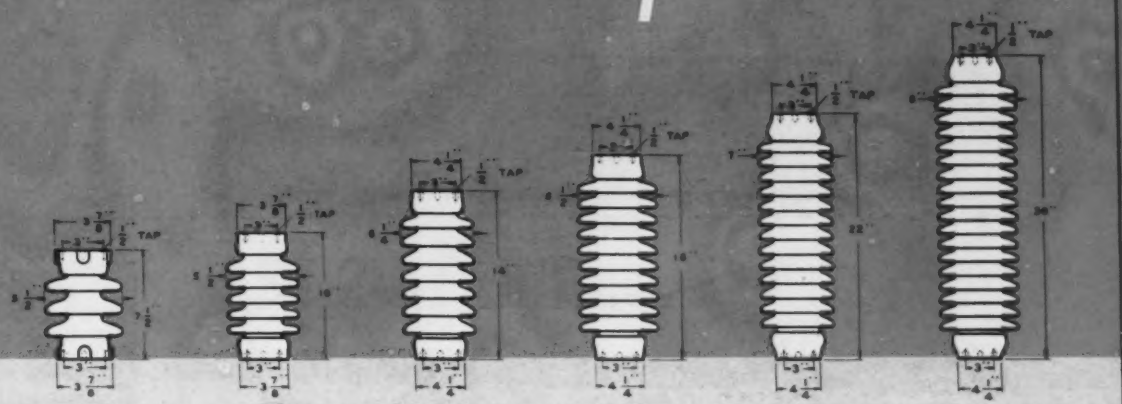
Lapp Insulator Co. Inc., LeRoy, N. Y.

STATION POSTS

FUNCTIONAL DESIGN FOR NORMAL DUTY SWITCH AND BUS SUPPORT ...AND INTERCHANGEABLE WITH STANDARD STATION POSTS (same heights and bolt circles)

1000 LB. CANTILEVER STRENGTH... UPRIGHT OR UNDERHUNG

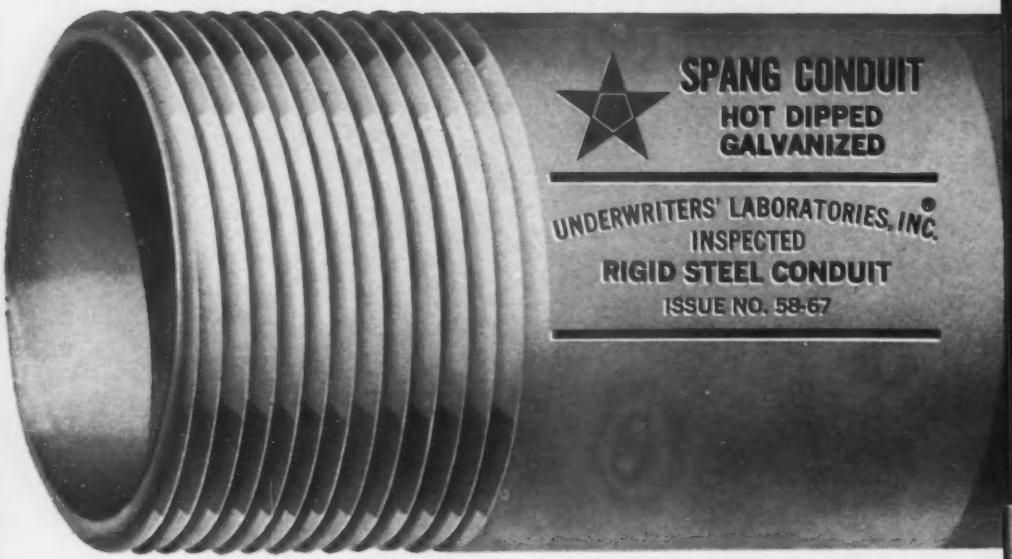
MEET EEI-NEMA STANDARDS IN ALL ELECTRICAL VALUES...



73631 73632 73633 73634 73635 73636

Catalog Number	73631	73632	73633	73634	73635	73636
DIMENSIONS						
Leakage Distance, Inches	10.5	15.5	24	37	43	72
Dry Arcing Distance, Inches	6	7.25	10.5	14.5	17	26
MECHANICAL VALUES						
Cantilever Strength, Pounds, Upright	1,000	1,000	1,000	1,000	1,000	1,000
Cantilever Strength, Pounds, Underhung	1,000	1,000	1,000	1,000	1,000	1,000
Tension Strength, Pounds	5,000	5,000	5,000	7,000	8,000	12,000
Torsion Strength, Inch-Pounds	6,000	7,000	8,000	10,000	12,000	15,000
Compression Strength, Pounds	10,000	10,000	10,000	15,000	15,000	25,000
ELECTRICAL VALUES						
Voltage Rating, kv	7.5	15	23	34.5	46	69
Low Frequency Dry Flashover, kv	60	85	110	145	170	235
Low Frequency Wet Flashover, kv	40	55	75	100	125	180
Impulse Flashover—Positive, kv	105	125	170	225	280	390
Impulse Flashover—Negative, kv	120	200	250	290	340	475
Low Frequency Withstand—1 Min. Dry, kv	35	50	70	95	120	175
Low Frequency Withstand—10 Sec. Wet, kv	30	45	60	80	100	145
Impulse Withstand, kv	95	110	150	200	250	350
RADIO INFLUENCE VOLTAGE DATA						
Test Voltage—Rms to Ground, kv	5	10	15	22	30	44
Maximum RIV—Microvolts at 1000 kc	50	50	100	100	200	200
PACKING AND SHIPPING DATA						
Net Weight, Each, Pounds	10	14	22	34	42	74
Packed Weight, Each, Pounds	11.5	17	25.5	39	51	85
Standard Package	6	3	3	3	2	2

look for this marking...



...and this tag
on every bundle

Your assurance of top protection against corrosion... of faster and better conduit installations

The new SPANG Blue Star Galvanized Rigid Steel Conduit now has the regular hot-dipped galvanized coating *plus* a second galvanized coating for extra protection against corrosion!

Threads are uniformly galvanized on every ridge and valley for easy coupling. No excess zinc to chase off . . . no bare spots. It's the best thread protection available against corrosion.

Double coating on the conduit inhibits rust formation. Finish won't flake off. Provides fine appearance in exposed locations.

Easier handling, too. SPANG Blue Star Conduit is bundled with steel strapping in sizes up through 1½". Shipped in one-ton lifts for fast handling by lift truck, easy inventory.

You owe it to yourself to try new SPANG Blue Star Conduit. Get complete details from your nearby SPANG Distributor.

SPANG Blue Star Conduit is one of the many fine products produced by *National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.*

ARMCO National Supply Division

Diagnosis: High Feed Pressure

Strongest corner-mounted derrick in the field is Holan's 7500 — a powerful, time-saving derrick that operates in an arc behind and to the right side of the truck.

Here's power . . . real power . . . all the up and down feed pressure needed to drive any derrick-suspended digger. And more than that, it's the only corner-mounted derrick built capable of handling Holan's rugged 3-speed 5400 Earth Borer.

Jobs can go ahead on schedule — even in alleys, narrow streets and congested areas because positioning problems are ended. Parked parallel to the curb, the 7500 swings over . . . even over fences and guard rails . . . reaches out . . . and digs deep holes, sets poles up to 70 feet in length.

The 7500 is engineered as a complete unit to avoid body and derrick stresses . . . can "live boom" 8,500 pounds, winch 10,000 pounds.

A semi-automatic locking device moves the earth borer onto the extendible boom for digging . . . or to its main boom storage position.

The 7500 . . . shown here mounted on the right side . . . is available mounted on the left side. It reaches up 27'-6", 18½' behind the truck, and beyond the right side 12'-3" (left-side mount) and 16'-10" (right-side mount) with boom extended.

Before you buy any corner-mounted derrick, write us — or call your Holan Field Representative — for complete details.

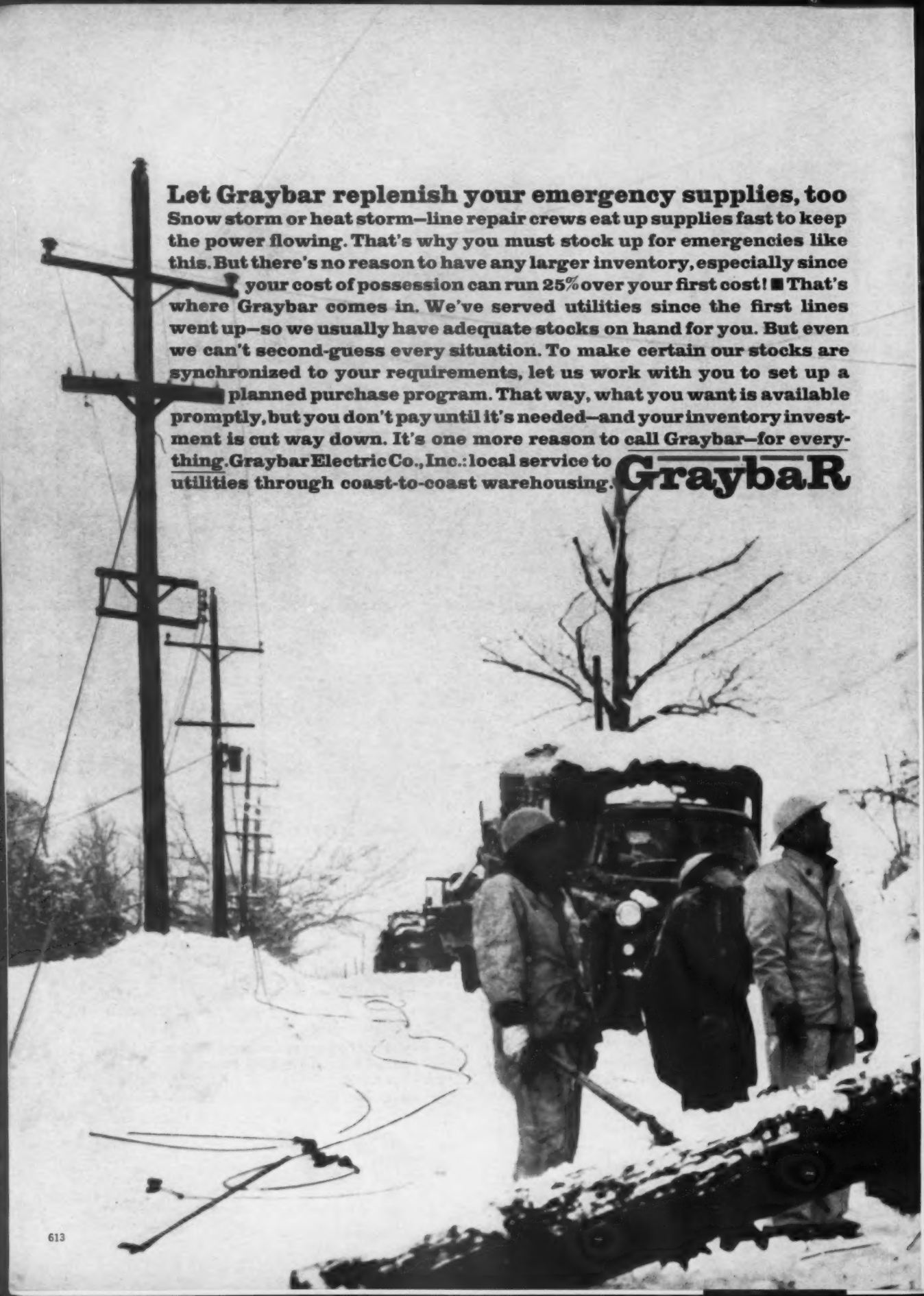
Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

For phone number of closest representative see advertising index in back of book.

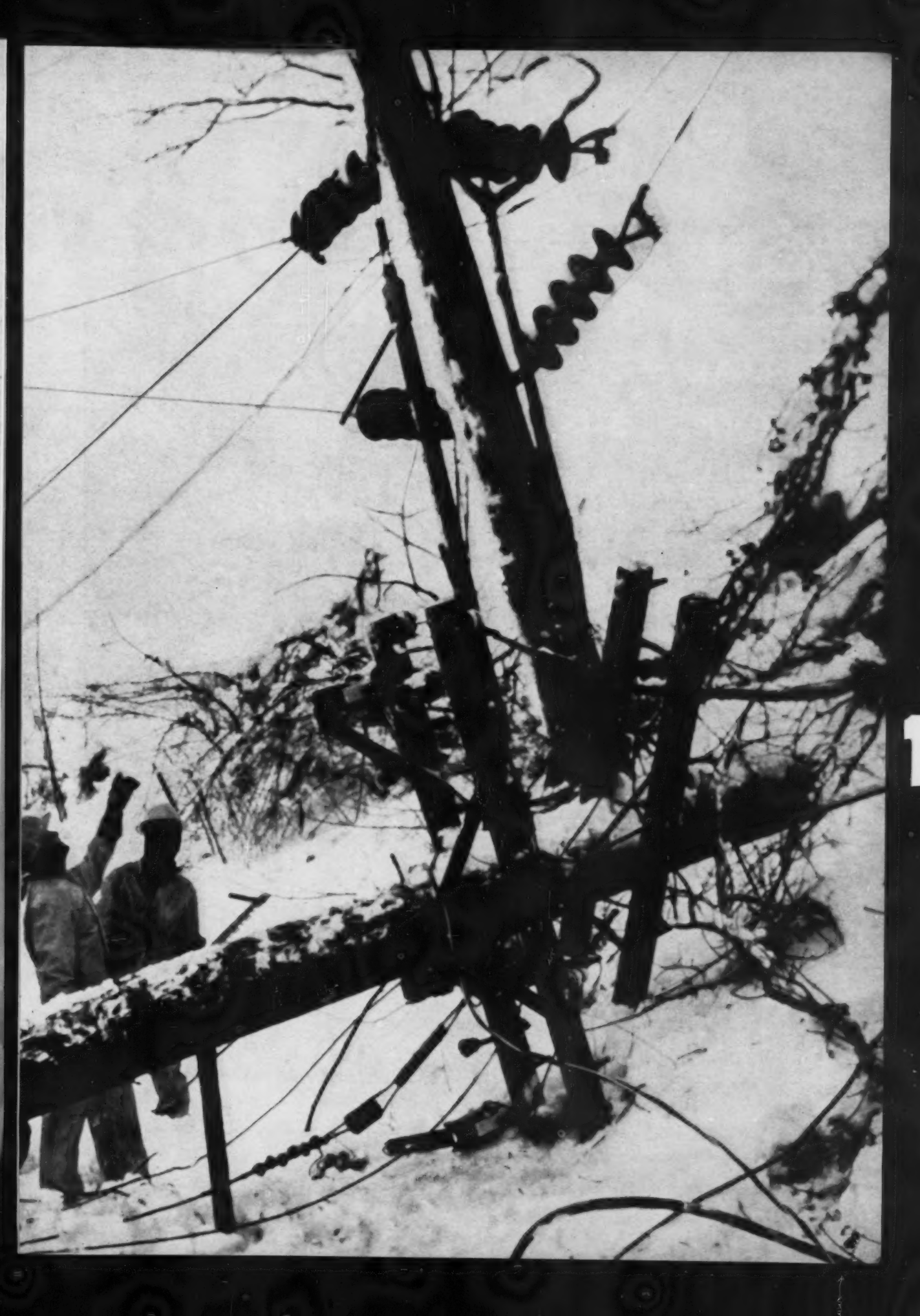


Let Graybar replenish your emergency supplies, too

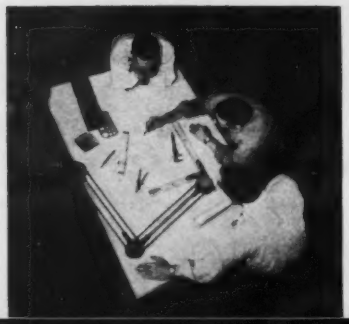
Snow storm or heat storm—line repair crews eat up supplies fast to keep the power flowing. That's why you must stock up for emergencies like this. But there's no reason to have any larger inventory, especially since your cost of possession can run 25% over your first cost! ■ That's where Graybar comes in. We've served utilities since the first lines went up—so we usually have adequate stocks on hand for you. But even we can't second-guess every situation. To make certain our stocks are synchronized to your requirements, let us work with you to set up a planned purchase program. That way, what you want is available promptly, but you don't pay until it's needed—and your inventory investment is cut way down. It's one more reason to call Graybar—for everything. Graybar Electric Co., Inc.: local service to utilities through coast-to-coast warehousing.

GraybaR

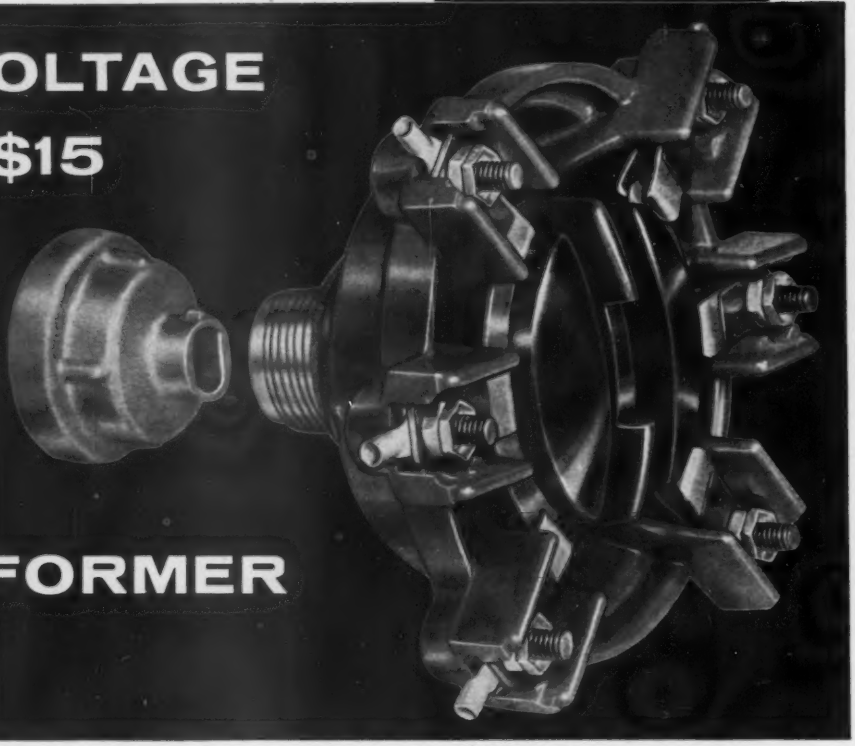
613



CONCENTRATION



DUAL VOLTAGE SAVES $15 OR MORE ON EVERY TRANSFORMER



Concentration on one idea has resulted in the new RT&E thoroughly tested and reliable Extern-O-Switch. This redesigned dual voltage switch makes **dependable** cut-over of entire areas to higher voltage at savings of $15 or more per transformer.

Extern-O-Switch body is made of an entirely new compound — a specialized glass-reinforced Polyester thermoset material. It is highly shock resistant and actually extinguishes arcs passed over its surface. Impossible to track, its characteristics are not affected by transformer oil or heat. Electrical insulation levels are increased by 50% with this exceptional material.

The unique externally operated handle reduces changeover to a simple twist of the wrist. Key-type handle cannot be removed unless the switch is correctly positioned. Inside, high pressure contact is assured. New leaf springs behind each contact prevent metal fatigue and provide lasting, positive contact pressure.

RT&E's concentrated research program developed these improvements to reduce man hours and save money. Protect your investment, look to RT&E — originator of the dual voltage transformer and externally operated switch.

Engineering Talent Concentrated On One Idea — **A BETTER TRANSFORMER**

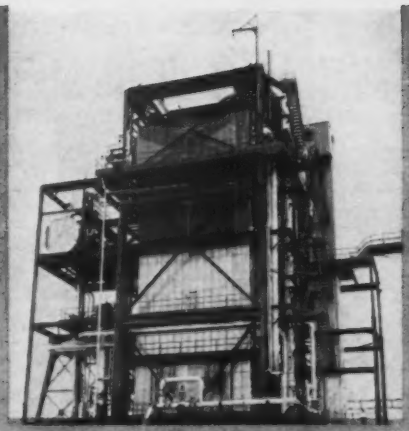
RT&E CORPORATION

WAUKESHA, WISCONSIN • PORTLAND, OREGON • ARLINGTON, TEXAS

SAFE! Unique keying action between handle and slotted ring around shaft assures positive positioning before handle can be removed.

TT

since 1948...
continuous expansion
at
Central Louisiana Electric
piped by Midwest



Coughlin Station

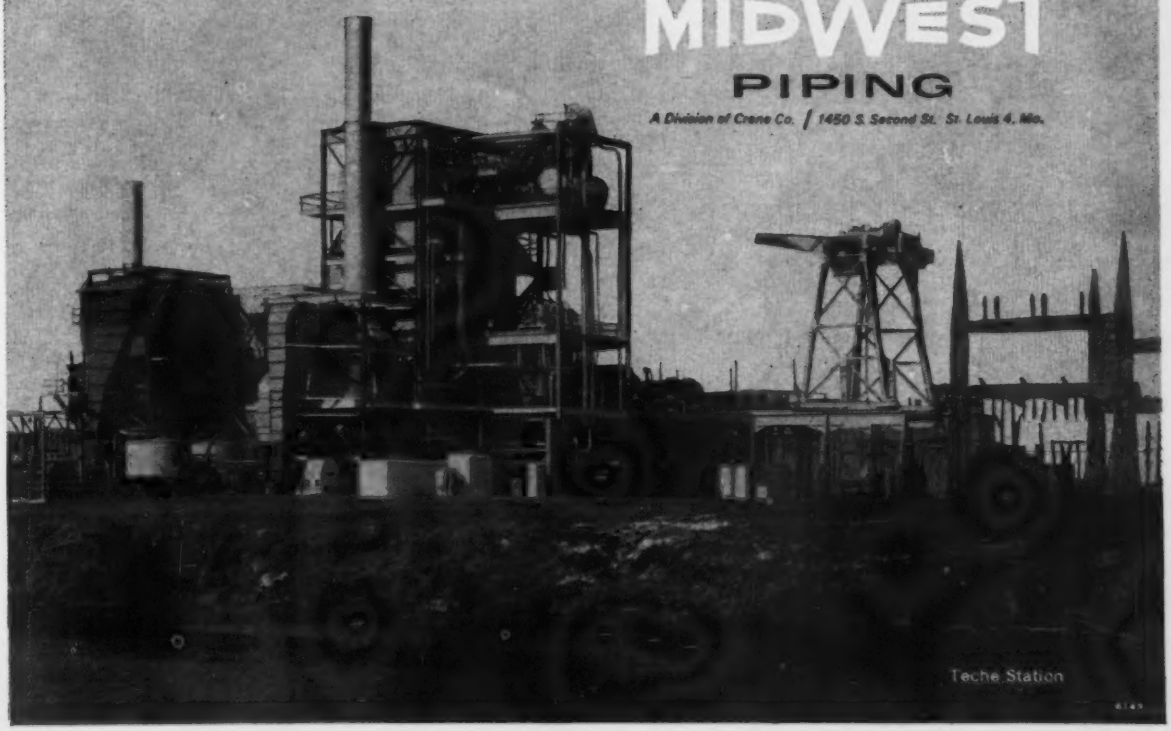
In 1948, Midwest fabricated and erected the piping for Central Louisiana Electric Company's Coughlin Station, Units 1 and 2. Total capacity for both units was 7,500 KW, operation conditions 625 pounds @ 825°.

Midwest continued to furnish piping for the station's four subsequent expansions, including a 100,000 KW unit in 1961, and for the first two units of the company's Teche station. Combined capacity of all units piped by Midwest was 270,000 KW.

Midwest's proven capabilities for quality fabrication and erection have resulted in "repeat business" like this from many major power companies.

The story of Midwest's coordinated fabrication-erection service is told in a 24-page illustrated brochure, POWER AND PROCESS PIPING. Write for your free copy today.

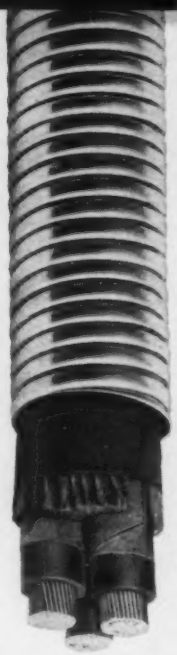
MIDWEST
PIPING
A Division of Crane Co. / 1450 S. Second St. St. Louis 4, Mo.



Teche Station

"Circloc" Interlocked Armored Power Cable

NOW AVAILABLE IN DIAMETERS TO 4 INCHES



With our newest armored cable machine in full production, Circle customers can now get high quality Circloc interlocked armored power cable in diameters up to 4 inches—the most complete range of sizes available anywhere. This recent addition to its modern manufacturing facilities is Circle's answer to the growing need for larger diameter armored cable for power distribution.

Circloc cable can be supplied with 2, 3 and 4 conductors with varnished cambric or butyl rubber insulation and voltage ratings of 600 to 15,000 volts. Armor is available in interlocking galvanized steel, aluminum or bronze.

For your next power cable installation, be sure to specify compact, dependable Circloc interlocking armored cable.

CIRCLE WIRE & CABLE CORP.

SUBSIDIARY OF **CERRO CORPORATION**

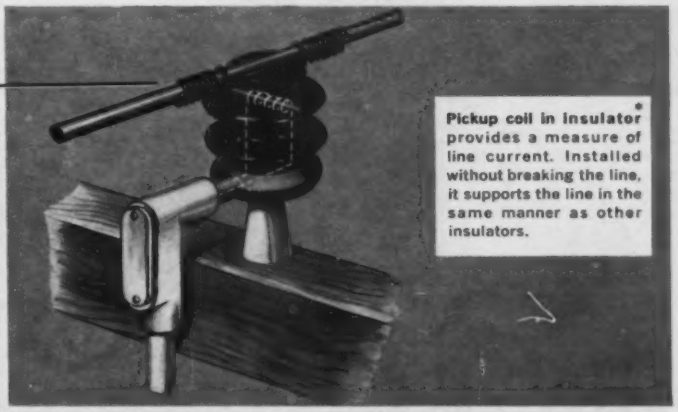
PLANTS: Maspeth and Hicksville, N. Y. **SALES OFFICES & WAREHOUSES:** In all principal cities.

Rubber Covered Wires & Cables • Varnished Cambric Cables • Plastic Insulated Cables • Neoprene Sheathed Cables • "CIRTUBE" EMT

ALLIS-CHALMERS

Extended Foil Capacitors

A-1494



Pickup coil in insulator* provides a measure of line current. Installed without breaking the line, it supports the line in the same manner as other insulators.

Current bias shorting relay* is mounted on the side of the control cabinet in a standard watt-hour meter mount. Its operating point can be easily adjusted from rear of the relay mount.

*Designed by the Fisher-Pierce Company

Slash installation time over 50%

with new voltage-sensitive, current-bias capacitor control

Employing an inductive pickup device rather than a current transformer as the signal source, the new Allis-Chalmers voltage-sensitive current-bias control can be installed *in less than half the time* required for existing controls.

By simply replacing the line insulator with the new pickup insulator, you can eliminate the time and effort of de-energizing, dead-ending and cutting into the line required for a conventional current transformer.

This new A-C capacitor control operates on either light or heavy system loads to switch capacitor banks for voltage correction and reactive kilovar supply.

For more facts on capacitor controls to maintain low-loss, high-power-factor system operation, contact your nearby A-C office. **Allis-Chalmers,** Power Equipment Division, Milwaukee 1, Wisconsin.

Allis-Chalmers extended foil design capacitors withstand higher inrush currents. Current densities are lower at point of contact between the packs and the contact plates than is possible with conventional tab-type capacitor construction.

For phone number of closest representative see advertising index in back of book.

ANACONDA WIRE & CABLE IS MADE IN THE WEST TO FIT THE NEEDS OF THE WEST

FROM ORANGE, CALIFORNIA MILL . . .

A full line of wire and cable is ready to go to work for utilities, contractors, electrical manufacturers – all of Western Industry.

Fast, efficient service directly to you, from nearly 100 Western Anaconda Distributors . . .

FROM REDWOOD CITY, CALIFORNIA MILL . . .

A wide range of highly specialized products meets the exacting needs of the electronics and missile industries. This new Anaconda facility, formerly the Sequoia Wire & Cable Company, rounds out Anaconda's complete wire and cable service to the West.

Call the Man from Anaconda at Sales Offices in Denver, Los Angeles, San Francisco or Seattle. Or see your local Anaconda Distributor. 61371

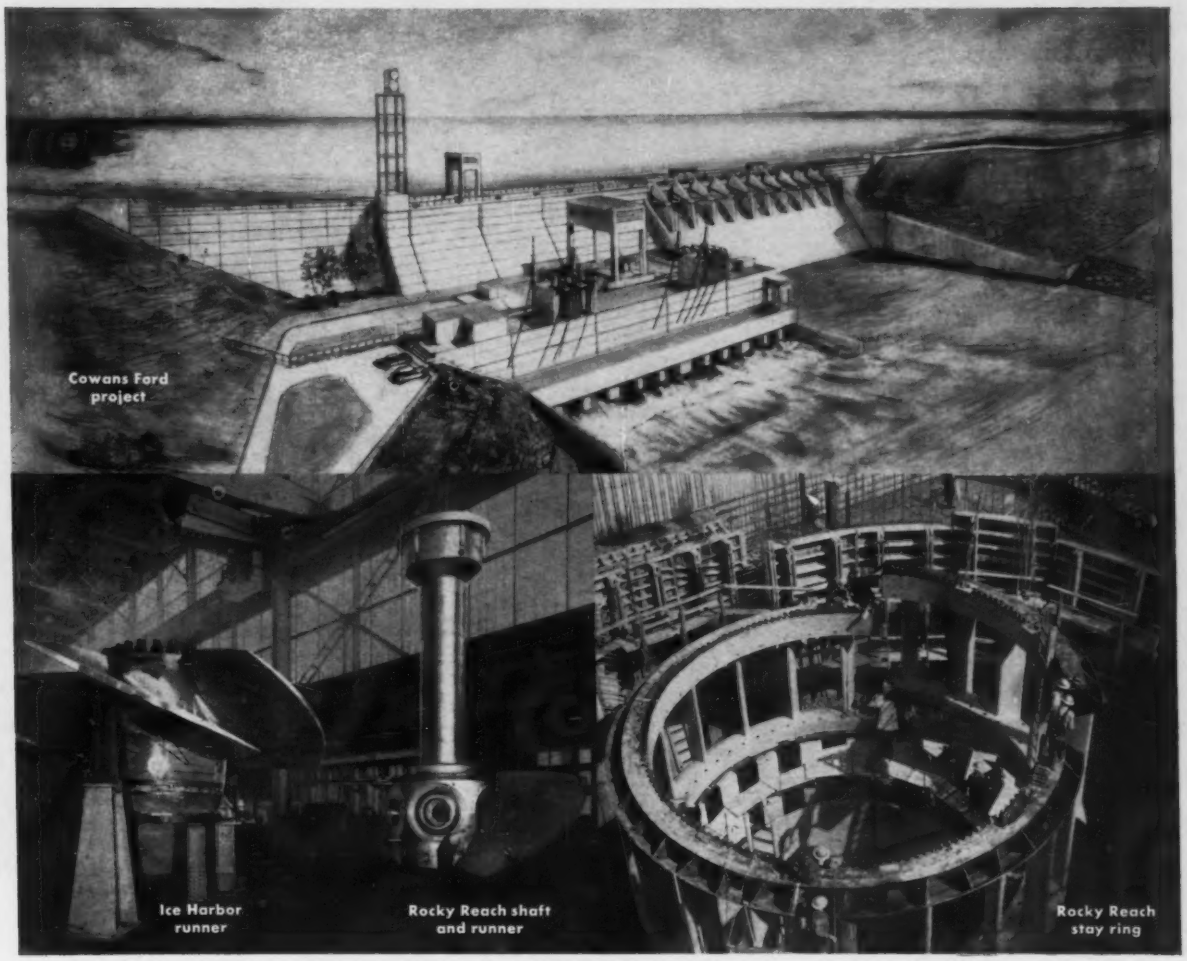
ASK THE MAN FROM

ANACONDA®

COPPER AND ALUMINUM WIRE AND CABLE

For phone number of closest representative see advertising index in back of book.

ALLIS-CHALMERS



high-head Kaplans for peaking

—previous record-breakers also by Allis-Chalmers

Cowans Ford is the outstanding illustration of Kaplan turbines used to provide peaking capacity. Duke Power Company, with Chas. T. Main Inc. as consulting engineers, has selected A-C Kaplan turbines for operation at 115-ft. head. Each of the three units is guaranteed to provide a maximum of 153,000 hp. Actual operation will involve only a short time each day, meeting peaking requirements of the system which is predominantly steam. The resulting average load factor, *less than 5%*.

KAPLAN RECORD-BREAKERS

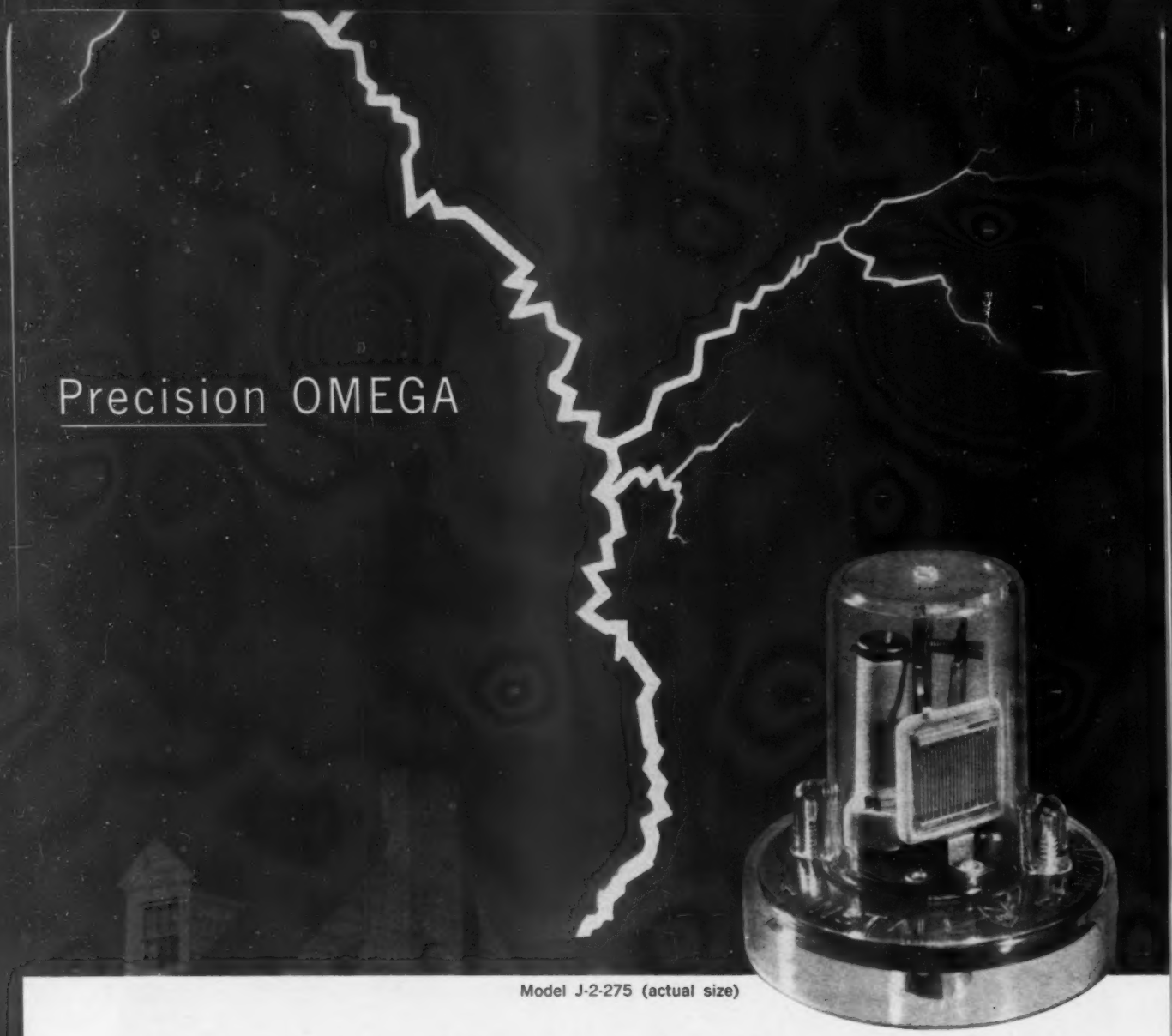
Cowans Ford—the third in a series of outstanding A-C Kaplan turbine installations. These units exceed those at both Ice Harbor and Rocky Reach in rated capacity and head. All are similar in construction (those at Cowans Ford are slightly smaller in physical size). Allis-Chalmers diversified experience to date includes over 240 Kaplan turbines — *a record 6 million hp.*

Rocky Reach—public utility district supplied with seven Kaplan turbines, each 140,000 hp (under 92-ft. head).

Ice Harbor — Corps of Engineers installation recently provided with three new A-C Kaplans for operation at 89-ft. head. These held the record with 143,000 hp per turbine until Cowans Ford.

In every facet of hydro generation, people count on record performance and experience from Allis-Chalmers. For assistance anytime, contact your local A-C representative or write to **Allis-Chalmers,** Hydraulic Division, York, Pa. A-1383

For phone number of closest representative see advertising index in back of book.



Model J-2-275 (actual size)

Now—Precision withstands any lightning surge better

Compare this *new* Precision Omega with any other photocontrol at any price. You can *see* the engineering distinctions that make Precision's 2-component circuit (plus lightning arrester) the exclusive choice for lightning-proof multiple lighting in Key West, Florida.

Lightning surge — low- or high-voltage — can't phase the operational dependability of Precision "Omega" with its oversize lightning arrester — the most effective ever used in street lighting controls.

Neither can moisture in any climate, any weather. Precision's gold electrode photocell, proved failproof on hundreds of thousands of installations, now is hermetically sealed.

Now look at Precision's stainless steel cell mounting and rugged integrating relay which has given major utilities 99% failproof multiple lighting control for more than 5 years. Corrosion can never intrude upon Precision's positive ON at sunset, OFF at sunrise operation at the light levels you specify.

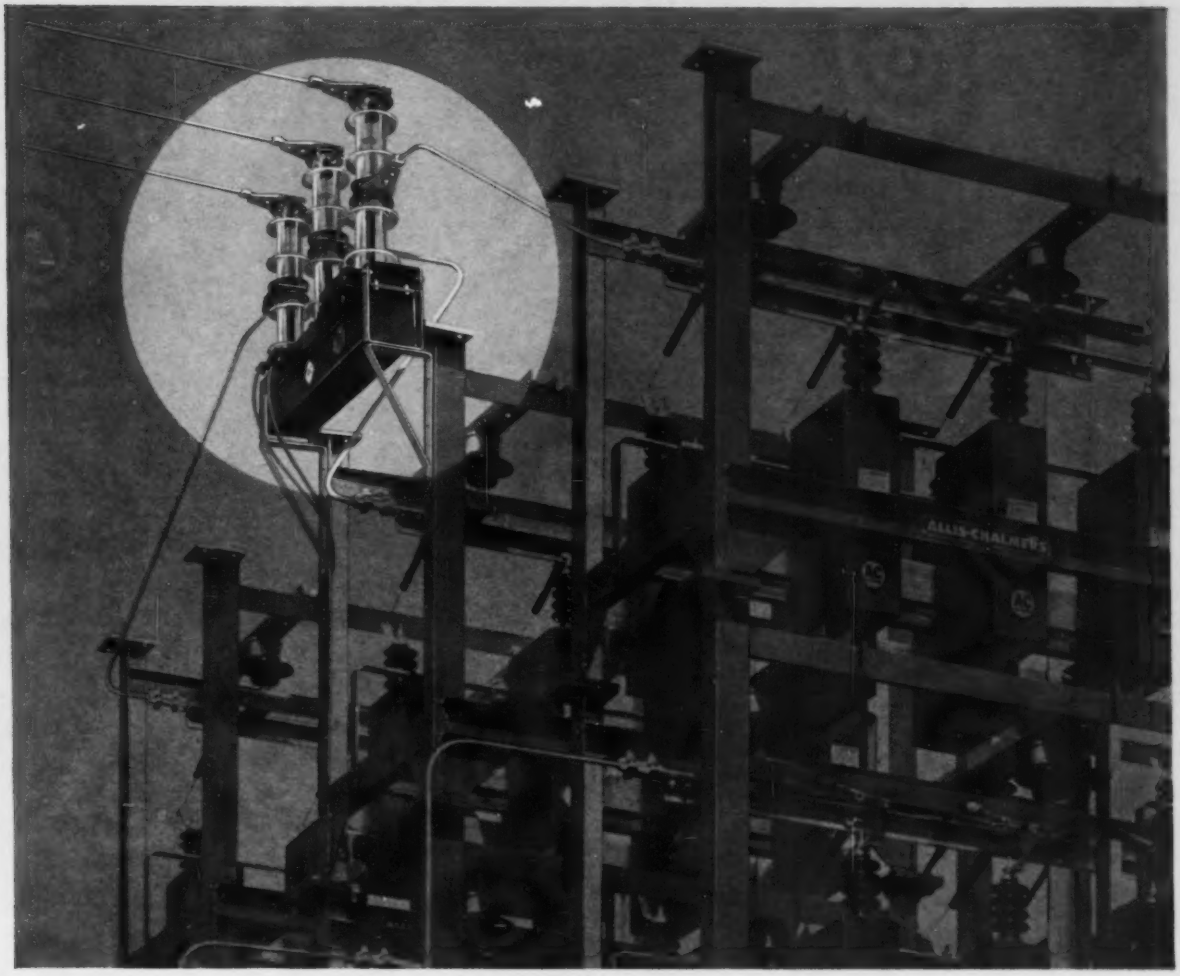
Add these features together and you can understand why Precision 2-component photocontrols are used on more installations than any other single circuitry. All sound reasons why we insist that Precision's new Omega is *the* best choice for utility buyers who think photocontrols should last forever under any conditions.

We invite comparative testing — on your lines or in your laboratories. Ask your Precision representative for quotations. Write—wire—phone for Technical Bulletin 770.

PRECISION MULTIPLE CONTROLS, INC., Ridgewood, New Jersey

The difference between night and day

ALLIS-CHALMERS



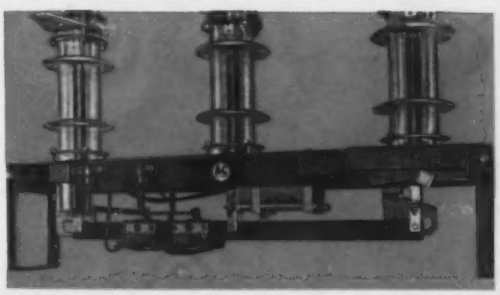
Now...a low-cost vacuum capacitor switch

Restrike-free... lightweight... reliable

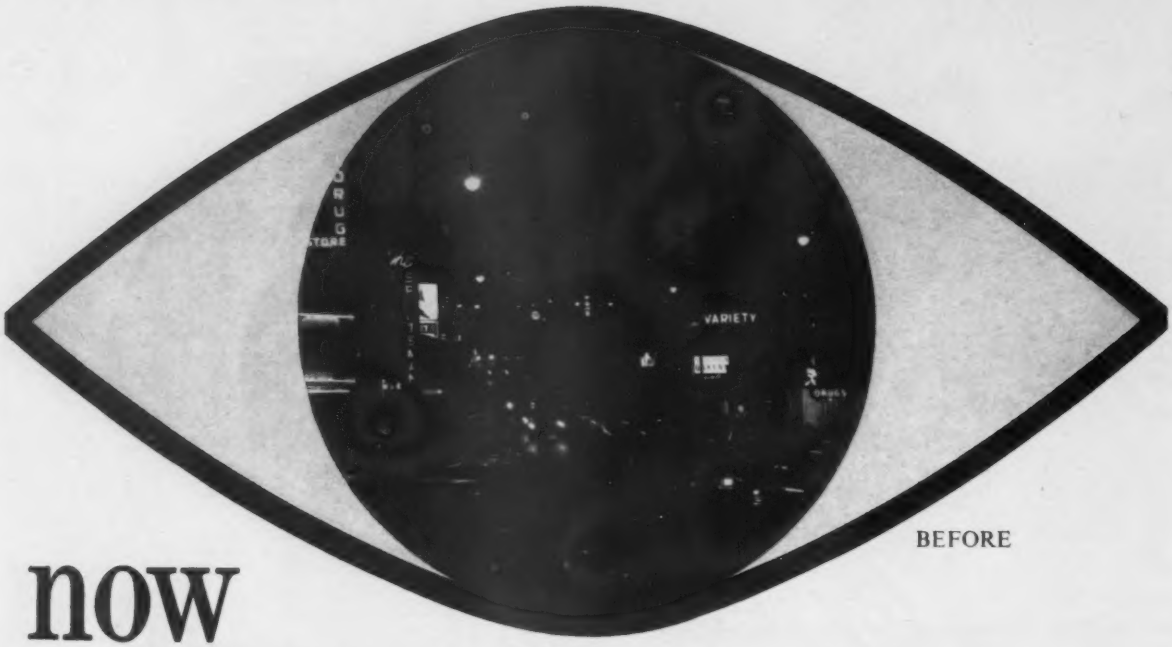
Competitive with conventional oil switches... this new 14.4-kv, 300-amp Allis-Chalmers three-phase vacuum switch is specifically engineered for capacitor duty. It operates from ac or dc, manually or by fully automatic control as the system demands. You get restrike-free performance, reliability and maintenance-free operation. Weight is one-third that of oil-type switches.

Resistance to physical damage is just as spectacular. Point-blank, 22-long rifle fire failed to penetrate the tough Plexiglas protective housing. The vacuum tubes withstood pressure tests in excess of 20 times normal closing forces.

For more information, contact your nearby A-C office. Or write **Allis-Chalmers,** *Power Equipment Division, Milwaukee 1, Wisconsin.* A-1409



How it works — Front view shows capacitor switch mechanism housing with cover removed. When coil is energized, solenoid plunger moves connecting rod through cam to close the contacts.



BEFORE

now see Sonora in a new light

There's a big difference in downtown Sonora now since Washington Street acquired a bright new look at night. Following a PG&E Master Street Lighting Plan, modern mercury vapor luminaires—with greater light output—have replaced incandescent lamps. No change in poles or wiring was needed. Results? Sonora's mayor, R. Wesley Eproson, praised "...the increase in protection of life and property and the feeling of civic pride and peace of mind that come from having well-lighted streets..." Ask PG&E about a free Master Street Lighting Plan for your city. Like Sonorans—you'll enjoy seeing your city in a new light.

P·G and E·
Pacific Gas and Electric Company

AFTER

Is yesterday soon enough?

Chances are Alcoa worked *yesterday* on precisely what you will need *tomorrow*.

Alcoa has been working on aluminum overhead conductor problems—and successfully solving them—longer than anyone else in the business.

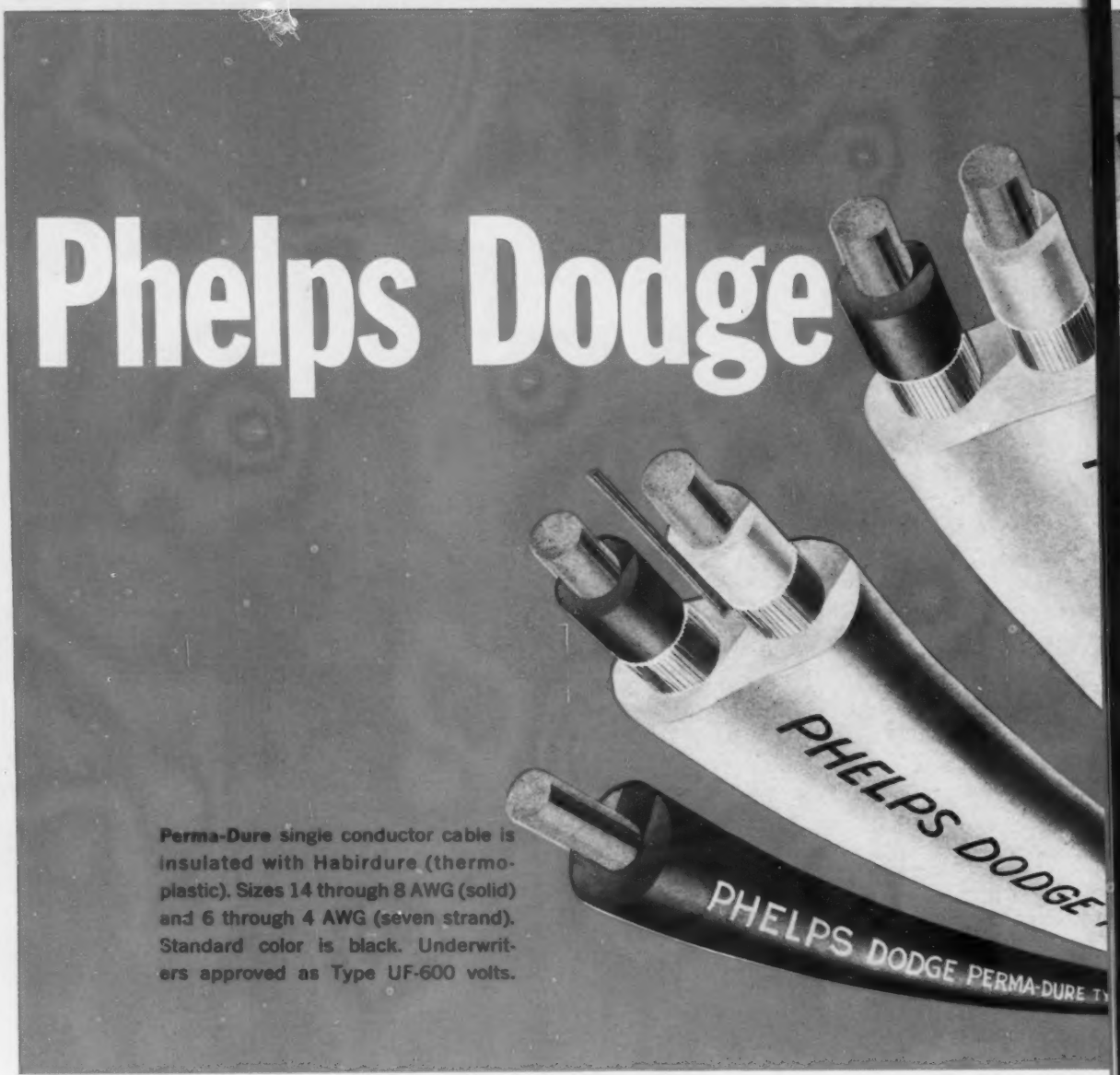
Take a look at the record. Alcoa supplied conductor for the first all-aluminum conductor installation in 1899—it is still in service. The first Alcoa® ACSR was shipped in July of 1909. Even EHV is history—Alcoa developed ACSR for handling 220 kv way back in 1913.

Since those early pioneering days, we've had a hand in almost every major transmission line development. For example, Alcoa's 2.32-inch ACSR: you'll find it on two experimental 460-kv lines energized in 1960.

What has this to do with you? Consider. Out of this experience has come the industry's largest corps of field advisors —ready to work for you today. A complete line of accessories and conductors—the only single source available to you today. A guarantee of 62% minimum conductivity—at no extra cost to you today. The most extensive technical data on aluminum—available to you today.

And what of tomorrow? Then—as now—Alcoa research will answer utilities' demand for new products and techniques in the same way: Is yesterday soon enough?

ALCOA
ROME CABLE
DIVISION



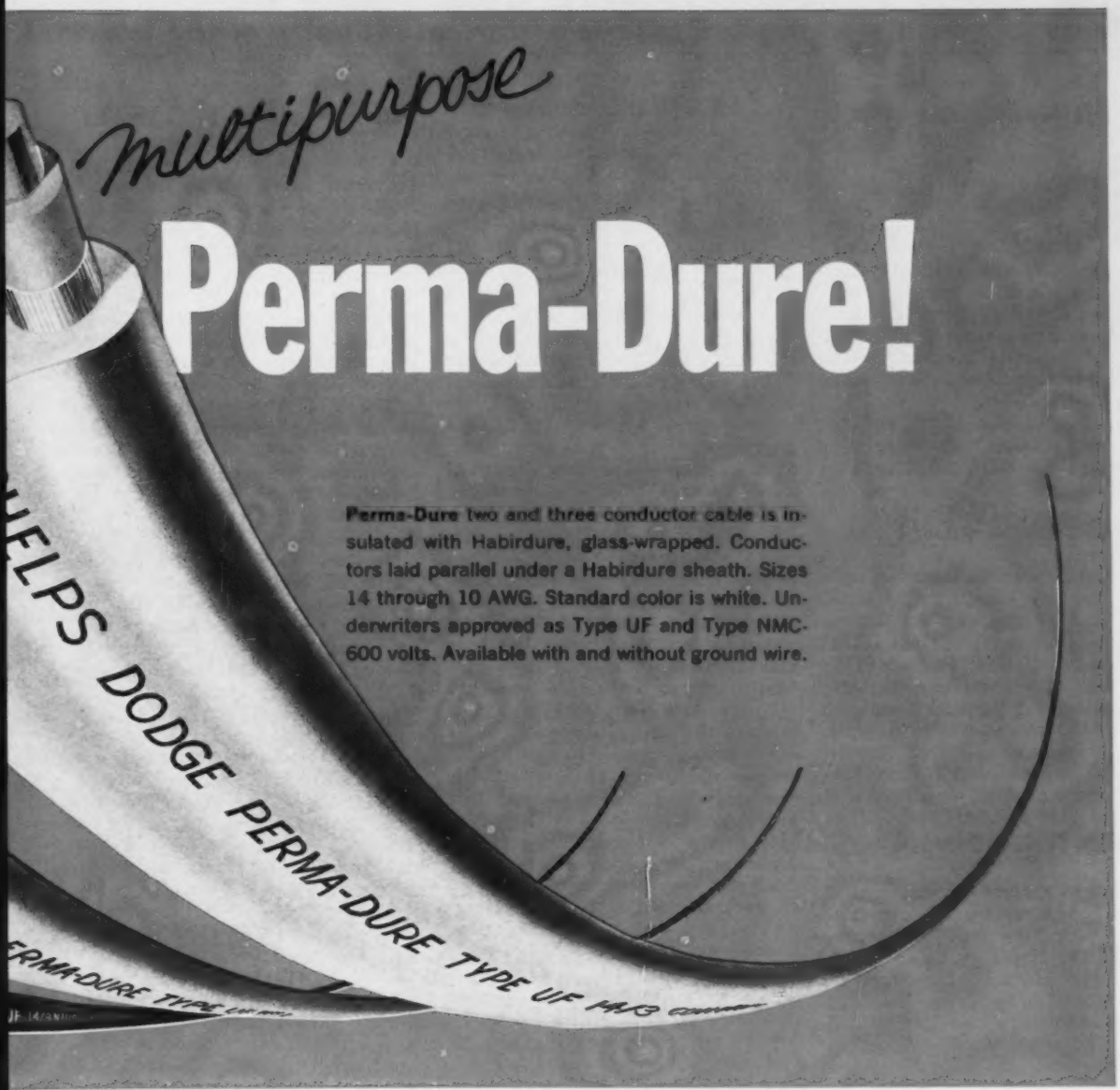
Perma-Dure single conductor cable is insulated with Habirdure (thermoplastic). Sizes 14 through 8 AWG (solid) and 6 through 4 AWG (seven strand). Standard color is black. Underwriters approved as Type UF-600 volts.

An Economical, Dependable Cable for • Underground

Perma-Dure, a Phelps Dodge product, provides electrical contractors with a durable, versatile type of flame-resistant cable for industrial and commercial use.

Perma-Dure handles easily, strips readily and helps cut installation time and costs. It is supplied in single, two and three conductors for feeder or branch circuits. Under the 1959 National Electrical Code, *Perma-Dure* is recognized as suitable for:

Type UF, single and multiple conductor, as feeder or branch circuit cable, for direct burial in the earth when provided with over-current protection.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Perma-Dure!
Perma-Dure two and three conductor cable is insulated with Habirdure, glass-wrapped. Conductors laid parallel under a Habirdure sheath. Sizes 14 through 10 AWG. Standard color is white. Underwriters approved as Type UF and Type NMC-600 volts. Available with and without ground wire.
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Type NMC, multiple conductor (moisture and corrosion resistant non-metallic sheathed cable) for installation in exposed or concealed locations, in dry, damp or corrosive conditions; inside masonry or tile walls; or embedded, when suitably protected, in plaster or shallow chase in masonry.

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NEWS

Edited for the electrical industry of the West

State Eyes Hanford Generators

BPA, AEC and Washington Department of Conservation representatives agreed in meeting at BPA headquarters Oct. 10 to "explore every possible avenue" for adding generating facilities to the Hanford production reactor. Washington's Governor Rosellini's power advisory board voted to investigate the feasibility of the state undertaking the project after the House voted down funds for Hanford.

Earl Coe, Washington director of conservation, said: "The cooperative attitude of the two federal agencies has encouraged me to pursue studies of the feasibility of Washington State financing and constructing the project."

Taking part in the meeting were Coe, BPA Administrator Charles F. Luce; H. H. Achipper, Carl N. Zangar and Chester G. Brinck, AEC Hanford installation; Truman Price, supervisor of power resources, State of Washington; Bernard Goldhammer, BPA power manager; Harry J. Hogan, regional solicitor, Department of Interior; and Robert Ratcliffe, regional solicitor's office.

Hawaiian Project Dropped

Efforts to harness volcanic heat in Hawaii as a source of electrical power have run out of steam. Though the slopes of Kilauea Volcano have abundant sources of under-ground heat, Hawaii Thermal Co. has abandoned its efforts to find steam under sufficient pressure to be economically valuable. Five holes were drilled in operations that extended from May to October. Equipment is being shifted to a project at Clearlake, Calif.

► FPC was to start a public hearing Oct. 30 in Washington, D. C., to determine whether the filling of the reservoir at a new hydroelectric power dam on the Columbia River **will have any adverse effect on fishways at the existing Rock Island Dam** approximately 42 miles upstream. The hearing will involve the Wanapum hydroelectric development of Grant County, Wash., PUD, being constructed as the second of two developments under an FPC license issued in 1955. The Wanapum reservoir is scheduled to be filled in May of 1963. The existing upstream dam is the Rock Island Dam, built in the early 1930s by Puget Power, with additional power facilities installed in 1952 by Chelan County PUD. The two are now joint licensees for the project, which is operated by the PUD.

BPA May Up Rates

The Bonneville Power Administration may have to increase its present rate of $17.50 per kilowatt-year by as much as 25% unless certain problems are speedily solved. The announcement was made by Charles Kinney, assistant BPA administrator, at the opening session of the Montana Rural Electric Cooperative Assn. in Kalispell, Mont.

Kinney emphasized that BPA is doing everything in its power to overcome its present difficulties, which he said include a mounting deficit, failure to market $30 million worth of secondary power last year and failure of industry in the Northwest to operate at 100% of capacity.

Kinney said that one of the solutions to the difficulties would be to sell secondary power to the Pacific Southwest through an intertie with that region. But he warned this would necessitate protective legislation that would establish regional preference for power produced in the Northwest. Otherwise, he added, California might siphon off all or the major part of the power produced here.

► **Sierra Pacific Power** Co. has offered to buy Truckee PUD for $300,000 or to lease it for 10 years at $100,000. According to President Fred L. Fletcher, the company is willing also to negotiate takeover of the district's water system. Under either plan Sierra Pacific would make system improvements.

NEWS INDEX

Communications	49
Growth	48
Manufacturers-Distributors	97
Market Development	56
Meetings Calendar	6
Nuclear News	52
People	57
Washington Report	47

Hearings Held on B. C. Project

Cost of power produced on the Columbia River will be among the lowest of any major potential hydroelectric reserve to be found in the world, Dr. Hugh Keenleyside, chairman of the B. C. Power Commission, told Provincial Water Rights Comptroller Arthur Paget at public hearings at Revelstoke of the commission's application for a water license as first step in the development.

The B. C. Power Commission, owned by the government, has been assigned to develop the Columbia if negotiations between Ottawa and British Columbia can be straightened out to permit conclusion of the Columbia River treaty.

Dr. Keenleyside did not quite contradict his big chief, Premier Bennett, who only two days earlier had predicted cost of the Columbia under certain conditions could run as high as 8 mills when transmitted to B. C. from U. S. plants.

Keenleyside said reports from a number of outstanding firms and consultants had demonstrated that the cost of power produced on the Columbia would be among the lowest of any major potential hydro source in the world. He did not indicate an actual figure. He made application for water rights to build the Mica Dam, largest of three planned for B. C. in the $458 million project.

Dr. E. R. Hertz of Caseco, power consultants, said exploratory engineering investigations had shown the dam completely feasible with construction material available nearby. He said surface investigations and laboratory tests of materials were proceeding.

The Mica Dam would be 2,500 ft long and flood 98,000 acres with water 383 ft deep at the dam site.

Dr. Hertz said Revelstoke would likely be the supply center for the mica project, 92 miles north.

Pulp and paper, mining, smelting and fertilizing industries are taking an interest in the development. Celgar Ltd., Castlegar, B. C., and Consolidated Mining & Smelting Co. appeared at the public hearings.

Celgar asked Paget to ensure that sufficient water by-passed Mica Dam to carry its logs between Revelstoke and Castlegar.

Consolidated (Cominco) wanted provincial guarantee that the Columbia development would not

mean curtailment of the power supply of its subsidiary, the West Kootenay Power & Light Co. Ltd. B. C. Hydro officials felt this problem did not affect the development by the commission but depended on agreements with U. S. power producers.

PP&L Team Speaks in S.F.

Pacific Power & Light's 1961 earnings (after preferred dividends) will total $15.5 million, it was reported to the San Francisco Security Analysts by a company team headed by Paul B. McKee, board chairman. This amounts to about $2.30 a share as compared with $2.14 last year.

The group, which spoke at a luncheon meeting, included McKee; A. S. Cummins, vice chairman; D. R. McClung, president; E. Robert de Luccia, vice president and chief engineer; Don C. Frisbee, vice president and treasurer; A. W. Trimble, vice president.

The showing was attributed to an increase in revenues following the merger with California Oregon Power Co. and to general improved business conditions. However, the full savings resulting from the merger will not be realized before mid-1962.

Low-cost coal found in Wyoming is one of the utility's new assets. The state was described by McKee as a "storehouse of Btu's."

The company will spend about $48 million this year in capital improvements and about $40 million in 1962. Plans for the next 10 years contemplate expenditure of $40 to $50 million annually.

► **A. E. Pearson,** vice president and treasurer of **Nevada Power Co.,** has announced that the utility expects to earn $1.54 to $1.60 a share this year on revenues of $12,750,000. This would give the company a record net revenue, about $1,900,000, compared with last year's net of $1,668,422. Revenues in 1960 were $10,665,834.

► **Los Angeles Department of Water & Power** electric plant revenue bonds in the amount of $18 million were offered Sept. 20. A group headed by Glore, Forgan & Co. and C. J. Devine & Co. was awarded the issue on an interest cost of 3.50%. The department's $15 million issue sold in June 1960 carried an interest rate of 3.68%.

► **Bonneville Power Administration's** energy sales dropped 3.8% in fiscal 1961 as compared with the previous year. Revenue fell off 2.3% to $67,098,000. Maximum demand on the system was down 7.1% from fiscal year 1961, it was reported. Maximum demand was 4,579 mw in 1961 compared with 4,928 mw in 1960.

PP&L President Don McClung points out features of the company's Lewis River development to Dick Casey of Dean Witter & Co. The model is one of several exhibits brought to San Francisco last month for the company's presentation to the Security Analysts

► **Washington Water Power Co.** realized $7,600,000 from sale of 160,000 shares of common stock, Board Chairman Kinney M. Robinson announced.

► **Sacramento Municipal Utility District** plans the sale of $10 million in revenue bonds for system expansion and has hired Bechtel Corp. of San Francisco to prepare a report certifying that the issue will not violate terms under which SMUD sold $85 million in revenue bonds to finance its Upper American River project. None of the new money would be used for that project, according to SMUD officials.

► **Reduction in salary** for senior B. C. Electric officials is looming. Dr. Gordon Shrum, named chairman when the company was taken over by the government, states the board of directors is considering staff salary reductions to bring them in line with those prevailing in other comparable organizations. He said salaries at the highest levels were out of line with those in other Crown corporations and with other Canadian utilities, whether privately or publicly owned.

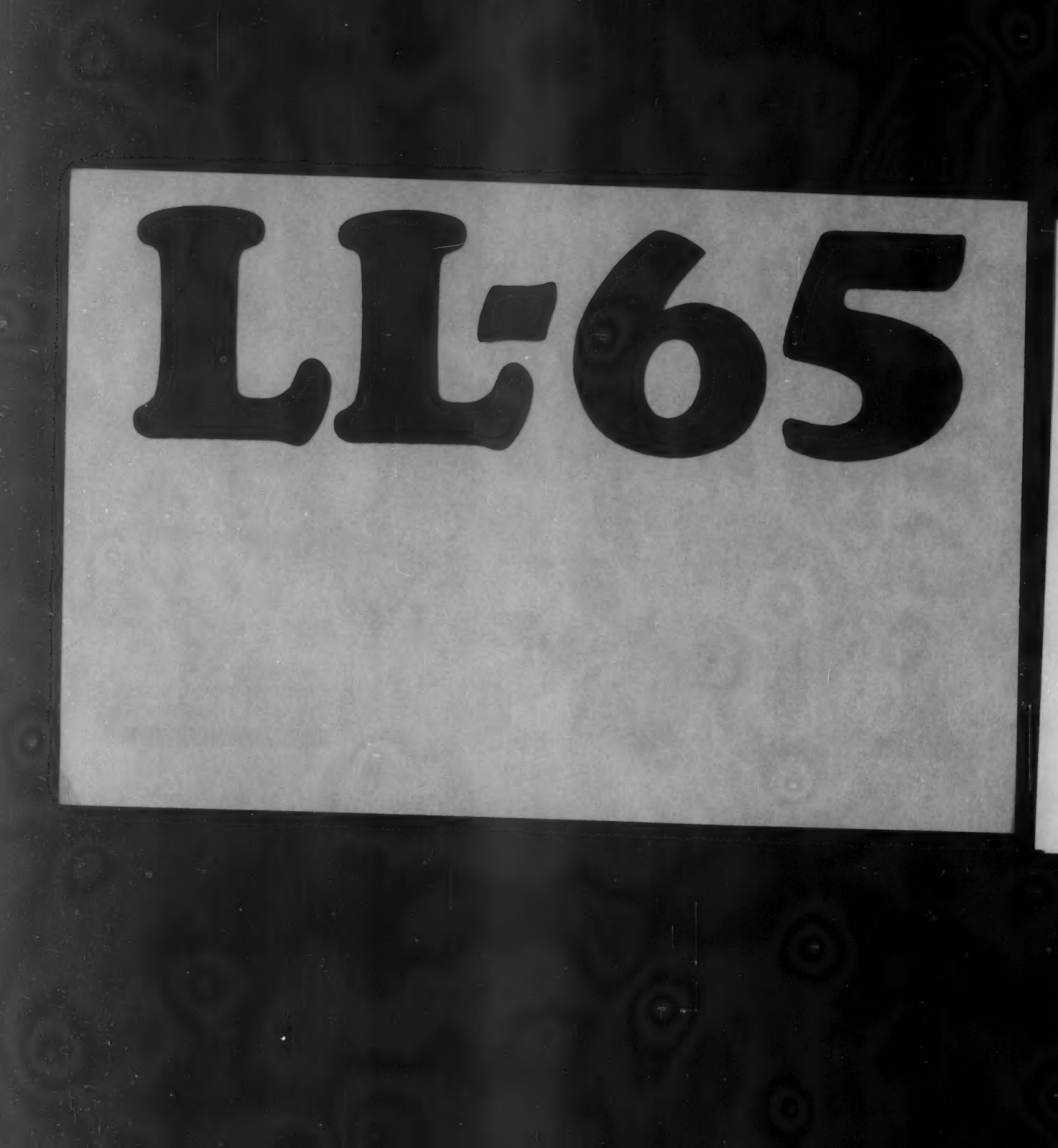
D-C Transmission Selected

The New Zealand Electricity Department has placed an order for $17 million worth of direct current conversion and transmission equipment from the Swedish firm ASEA Electric Inc. The equipment will transport 600 mw at 500 kv d-c (plus or minus 250 kv), 1,200 amp. The transmission will wheel the power from the plant at Bonmore, on the Southern Island, by submarine cable 26 miles across Cook Straight. The total distance is 383 miles. Schedule for operation is 1965. Cost per mile for transmission and conversion equipment is $44,400 or $28,300 per mw.

► Los Angeles City Council has ordered an **investigation into advertising policies and expenditures of the various city departments,** with a view to combining for minimum rates. The investigation was touched off by a $400,000 one-year advertising contract being negotiated by the Water & Power Commission with Irving Edelstein. Because the department is supported through its own revenues, its expenditures are not under council control. However, some council members expressed surprise at the figure and were reminded that the department must compete with privately owned gas companies.

LL-65

A NEW LOW LOSS TRANSFORMER FOR MORE PAYLOAD AT ANY LOAD


LL-65

LOAD IT HEAVY—
LOWER LOSSES

LOAD IT LIGHT—
LOWER LOSSES

LL-65

MORE PAYLOAD AT ANY LOAD

THERMAL PERFORMANCE—For many years, the major limitation in overloading a distribution transformer was the thermal factor. Westinghouse advances—such as improved oil, better tank seals, INSULDUR high temperature insulation, functional life testing—changed this. The thermal problem is no longer the limiting factor.

For example, a new Westinghouse LL-65, 15 kva unit can carry a 30 kva load while retaining its normal life expectancy. On an emergency basis, it can handle 33 kva safely. These load conditions are based on an extreme ambient condition of 35° C. Although loss of life is not a loading handicap, voltage drop and cost of losses are. The new LL-65 was developed to compensate for these limitations.

VOLTAGE PERFORMANCE—If a utility loaded a conventional 15 kva transformer (having 2% impedance) to 30 kva, there would be a 4.8 volt loss within the unit. With a Westinghouse LL-65, the impedance is reduced to a low 1.7%. The resultant loss in voltage under the identical load conditions would then be only 4 volts. As a result, the new Westinghouse LL-65 delays changeout by reducing voltage complaints and can carry higher peak loads before reaching the allowable minimum voltage limit.

Across the board, nameplate impedance has been decreased with the new LL-65 design, delaying capital expenditures caused by transformer voltage complaints.

ECONOMIC PERFORMANCE—The new Westinghouse LL-65 will save operating dollars for any utility *at any load*. Significant reductions in copper and iron losses not only reduce operating costs, but also improve voltage conditions and reduce regulation costs.

Although most manufacturers base loss and impedance guarantees on a 75° C. basis, the LL-65 performance values are based on an 85° C. reference point. When directly compared, the LL-65 losses should be reduced approximately 3% to compensate for changing the reference point to 75° C.

Use your own evaluation system and values. Based on the studies of several major utilities, the new LL-65 saves 10% to 15% in evaluated costs.

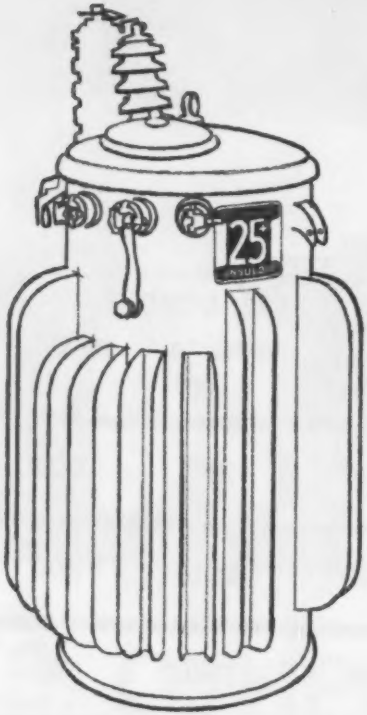
COMPARE LOSSES

LL:65

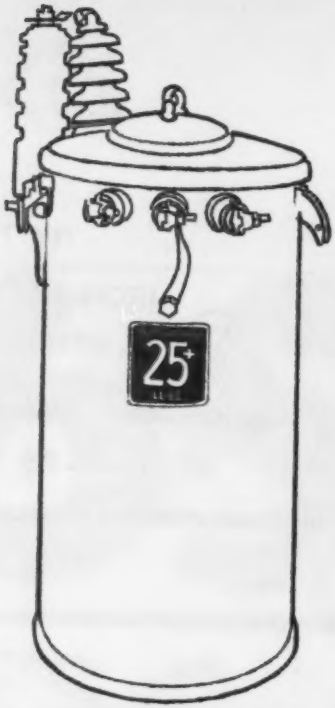
VS. OTHER MAKES

HV 7200 LV 120/240

KVA	IRON LOSSES			TOTAL LOSSES		
	(W)	MFR. "A"	MFR. "B"	(W) @ 85°	MFR. "A" @ 75°	MFR. "B" @ 75°
10	67	68	68	208	215	229
15	83	82	92	289	295	302
50	204	170	238	759	780	763



OLD



NEW

LL-65

8 ADVANTAGES

10%-15% Lower Evaluated Cost—Even greater savings were reported by some utilities when first cost, operating cost and delayed changeouts were compared with conventional 55° units.

Bonus Overload Capacity—The basic load time curves are the same and permit utilities to follow the same or improved loading practices when compared with 55° units.

New Loss Ratio—A new ratio permits lower operating costs . . . the greater the load, the more the savings. For each watt of no load there will be 2.5 watts of load loss at nameplate rating.

Lower Cost at Any Load—The LL-65 reduces operating costs at any load, regardless of load factor or loss factor on a particular system. Lowered copper losses result in lower impedances.

Lower Impedance—Voltage drop at any load is reduced. At full load the regulation is less than most 55° designs. With an average load growth (3%), voltage complaints may be delayed from 1 to 5 years.

New Hi-Temp Oil—An improved formulation, having a flash point of 145° C. (versus old oil 135° C.). This new oil offers a plus safety factor for heavily loaded transformers.

New INSULDUR®—A new patented insulating system permits operating temperature increases without sacrifice of insulation life . . . greater oil life . . . free life insurance for your transformers.

Greater Life Expectancy—INSULDUR® permits up to 30° more rise, but the LL-65 is designed for an increase of only 10°. This provides an increased safety factor or greater life expectancy.

LL-65

For more information about the LL-65, consult your Westinghouse sales engineer or write: Transformer Dept., Westinghouse Electric Corporation, Sunnyvale, Calif.

LL-65

DELIVERS YOUR BIGGEST PAYLOAD
AT ANY LOAD—10, 15 AND 25 KVA
UNITS NOW IN PRODUCTION.
YOU CAN BE SURE... IF IT'S
Westinghouse

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Dispute Right to Serve

Two Oregon municipal electric systems, Eugene Water & Electric Board and Springfield Utility Board, have locked horns on right to acquire Pacific Power & Light Co. facilities in an area north of Springfield's present service area.

The PP&L facilities are part of the package Springfield voters twice refused to purchase. Now EW&EB has proposed buying the PP&L facilities along with others in rural and suburban areas surrounding Eugene.

Eugene bases its right to serve the territory on a 1949 agreement with the smaller electric system of neighboring Springfield. Springfield has since annexed territory and feels the 1949 agreement was based on conditions that no longer exist. It charges that EW&EB, by offering to buy the PP&L facilities serving some 900 electric customers in the area, is encroaching on SUB's "natural area of expansion."

Springfield wants to try again to buy out PP&L and has asked the private utility if it will keep the price at the same level. Last June Springfield voters rejected by a narrow margin a $3.9 million bond issue to buy out the private utility.

The situation is further muddled by the fact that 1949 agreement provides that Springfield can acquire EW&EB properties in east Springfield serving 900 customers at a figure said by Byron Price, EW&EB superintendent, to be only one-third to one-half of fair market value. The territory was annexed to Springfield in 1960. Springfield has never moved to take over these properties. Its dilemma: the 900 EW&EB customers are served at lower rates by Eugene than they would be by SUB so, as Springfield voters, they are not likely to favor an acquisition bond issue that would increase their electric rates. To get around the dilemma, SUB has voted to conduct a rate study to determine whether it is feasible to lower its rates to match those of Eugene.

Springfield is also preparing a proposed amendment to the 1949 agreement that gives Springfield rather than Eugene priority in serving the growing suburban area north of Springfield. Jack Criswell, SUB superintendent, has called the disputed area "the cream of the power package" of total PP&L facilities Springfield wants to acquire.

AUTO SMOG CONTROL, recently approved at Los Angeles, is shown by Smith Griswold, county air pollution control officer, to County Supervisor Warren Dorn and President Jack K. Horton of Southern California Edison Co. Edison is the first industrial firm to begin installing the "de-smoggers" on its fleet of cars and trucks—about 2,600 vehicles in all. Horton said that the utility had run its own test on the crankcase control system and had found it satisfactory insofar as maintenance is concerned

► Design contract for an estimated $933,400 **air conditioning system for the Interior Building in Portland** has been awarded to Thomas E. Taylor, Portland consulting mechanical engineer, by the General Services Administration. The design is expected to be completed by April 1962, with bid opening expected about May 1. A GSA spokesman said total cost is expected to be about $1,100,000.

Directors Approve Merger

Directors of Public Service Co. of Colorado and Colorado Central Power Co. have approved a merger agreement, it was announced jointly by R. T. Person, PSC president, and James W. Cryder, president of CCP. Plans called for a special meeting of shareholders on Nov. 21 to vote on the merger, which is scheduled to be effective about Jan. 1, 1962.

Public Service Co. will file a registration with SEC for the sale of $30 million of first mortgage bonds, proceeds to be used to retire outstanding short term loans and finance the construction program.

► **Public relations** department of the B. C. Electric has been merged with the industrial relations division and now is under the director of industrial relations vice president, J. J. Carson. Before being taken over by the government, the BCE public relations department was one of the largest in western Canada. Under the government ownership, the role of the department is being de-emphasized.

Public Relations Builder

"People and the Power Business," a program to help build better customer relations, is being presented to Puget Sound Power & Light Co. employees.

Prepared by the public relations department, the program consists of eight two-hour meetings, held on company time. Discussions will be aimed at broadening the employee understanding of the company's customer and public relations objectives.

The eight meetings will include a review of industry and Puget history; discussion of employee, customer and stockholder relations; principles of human relations and customer relations; objectives of internal and external communications; principles of sales and services; rates and regulation; and Puget plans for the future. Each topic will be illustrated with films produced by Puget Power or the Edison Electric Institute.

WASHINGTON REPORT

Udall Discusses Issues

Interior Secretary Stewart Udall refused to say recently in a Washington press conference whether he is willing to negotiate for wheeling of federal power in place of building some of the controversial Upper Colorado project lines between the three hydroelectric projects and major load centers.

"I think I can simply say at this time," Udall said, "and I would rather not discuss specific lines—in fact, I will not—but there are certain ones we consider backbone, and I don't think these are open to negotiation . . . I know this is rather muddy . . . But we will just have to leave it that way."

Udall fuzzed up his answers on the Colorado lines for two reasons: (1) "The Bureau of Reclamation people are preparing some studies now which we will discuss shortly . . . I would expect within the next two or three weeks we may have some announcements to make on the basic decisions"; and (2) "We started some conversations, negotiations, with some of the private power companies. I expect to reach agreement with them on some of the lines . . . We will make some decisions fairly soon."

Udall also declined to be committed on what he terms the "backbone" system; but he did say, "We are on a state-by-state basis, however, ready for discussions with regard to some of the particular lines which are not, in our view, necessarily backbone lines; and by that, lines, I mean lines which we feel must be built by the federal government in order to link up the federal system and protect its basic integrity with regard to our ability to transfer power back and forth the way we will need to in the system . . .

"We are not just going to start round number three . . . all over again and have discussions of all of the lines."

One point Udall reiterated was that he wasn't thinking of any "package" proposal, either all federal or all private: "I always thought this was unfortunate – an either or proposition – and, actually, I think probably the best system from the standpoint of everyone concerned will involve a mixed system."

"We are not going to talk about any package proposition (with the companies), such as was presented to Congress," said Udall, "and this is . . . the point I was trying to get across—that I do consider that Congress made at least part of the decision for us." Udall here implies that Congress refuted a private package plan, but didn't close the door to separate negotiations. He continued: "We are merely opening up negotiations in some areas with some of the power companies involved, to discuss particular lines; not to discuss an over-all plan; and I am hopeful from the things that have emerged so far that we will be able to work out some arrangements with some of the private utility companies. I think we are going to find that the individual companies will be ready to discuss the specific proposals in their areas . . ."

Negotiations between the bureau and Utah Power & Light were held the first week of October in Utah, when Assistant Reclamation Commissioner N. B. Bennett Jr. visited that state to discuss Colorado lines.

Little construction of the controversial lines, actually, will get underway this year.

Here's a rundown on work started on the noncontested lines:

- Glen Canyon Dam to Shiprock, N. M. (Four Corners area): A contract was let in September to start building transmission towers for a 230-kv line—part of this to be open to manufacturers for installation of experimental towers and extra high voltage transmission facilities.
- Shiprock to Curecanti Dam, Colo., has been about 60% surveyed, and design work is under way on a 230-kv line. A construction contract probably will be awarded in February 1962.
- Other lines already under construction for some time are Montrose-Gunnison, Colo., 115 kv; Craig-Oak Creek, Colo., 115 kv; Vernal, Utah-Rangely, Colo., 138 kv; Flaming Gorge Dam-Vernal, 115 kv. Incidentally, Moon Lake Co-op's 115-kv line up from Vernal to Flaming Gorge (financed at double size by the Rural Electrification Administration to supply power to the Flaming Gorge construction camp) probably will be used by the bureau to help bring power down to Vernal from Flaming Gorge—as Moon Lake had planned.

The status of contested lines:

- The big 345-kv line from Glen Canyon to Pinnacle Peak, Ariz., (Phoenix) is being surveyed now, and construction would be decided upon after March 1, 1962, if its feasibility also is proved.
- The Shiprock-Albuquerque line, 230 kv, will be surveyed soon but feasibility probably won't be settled before April 1, 1962.
- The Curecanti-Midway, Colo., line, 230 kv, won't be touched until next spring, because of high altitude and heavy snows. Surveys might begin in late spring.
- The Curecanti-Rangely, Colo., line, 230 kv, likewise will be put off till high mountain snows have melted.
- The 138-kv line from Springville to Central Valley, Utah, also will be put off till spring, mainly because of its lower priority.
- Lowest priority has been assigned to the 138-kv lines up from Glen Canyon to St. George, Sigurd, Paragonah, Gunnison and Fillmore, Utah. No survey, design of feasibility work will be started on these lines for some time.

Udall also mentioned these issues:

Bonneville-California intertie – the November 1 deadline, set for a final report by an Interior Department task force on the Bonneville-California intertie, probably won't be met, "due to some of the recent developments.

"Of course, as you know, Congress voted us additional money to make studies of greater depth. We were conducting the existing intertie study just by using our—some of our —best people in the department, on a part-time basis. The new money ($300,000) that Congress has given us will enable us to hire outside consultants to go into some of these problems in further depth, and I think this means probably we are going to want to take more time."

Federal-private cooperation on common carriers – "I hope, before Congress returns, in time for consideration by the next (session of) Congress," said Udall, "our studies will have proceeded to the point, and our discussions with leaders of the private sector, that perhaps we can come up with some proposals for joint action to unusual advantage in the field of interties.

"We have federal power installations, largely on the rivers, largely hydro and . . . of course, the great bulk of the industry is in the private sector, and it is largely thermal; but blending the two together, tying together the various regions, I am convinced – whether we accomplish it or not – that it is in the interest of everyone – in this particular area of interties – to get together and work out some agreements, and I am going to do the level best that I can, with my people, to see that we conduct a successful negotiation in this area."

GROWTH

Priest Rapids Complete

Final inspection of Priest Rapids Dam has been started by officials of the Grant County PUD in preparation for acceptance of the contract completion by Merritt-Chapman & Scott Corp., New York.

Official completion date of the contract was Sept. 21, 1961. PUD officials said formal acceptance of the contract may come within the next few weeks. At one time the project was 16 months ahead of schedule, but work was slowed in 1960 by generator and transformer troubles.

The first generator went on the line Oct. 19, 1959. From that time until the Sept. 21, 1961, completion date, the dam has produced 4,717,-051,000 kwh of power.

E. B. Gibbons, PUD manager, said all 10 generating units are now available for generation.

He said that when the PUD completes Wanapum Dam, a sister project on the Columbia River in eastern Washington, the PUD will become the nation's third largest producer of electric power—surpassed only by the federal government and New York State. The two dams will have a total name-plate rating of 1,619,750 kw (788,500 for Priest Rapids and 831,250 for Wanapum).

Bonneville Test Line

Bonneville Power Administration recently completed installation of the first experimental 460-500 kv conductor west of the Rockies. Highest present transmission voltage in the region is 345 kv.

BPA Administrator Charles F. Luce said line tests will open the way of an eventual transmission voltage of 500 kv on the Pacific Northwest federal grid.

Two 4,000-ft sections of aluminum conductor, more than two inches in diameter, are being installed in BPA's 80-mile Big Eddy-McLoughlin 345-kv transmission line near Sandy, Ore.

Technological advances in extra-high-voltage transmission make the extra high voltage feasible in moving large blocks of power from federal and nonfederal plants in the middle and upper Columbia to coastal load centers, Luce pointed out.

"Feasibility studies are now under way to determine advantages of using 500-kv transmission to carry power from John Day Dam to coastal load centers with initial generation scheduled for 1967-68," said Luce.

Luce said Pacific Northwest transmission requirements increase at the rate of about 1,000,000 kw annually and require rights-of-way over about 10,000 acres of land with 230-kv transmission. Where 500-kv transmission is feasible, right-of-way requirements would be greatly reduced.

Packwood Contracts

Washington Public Power Supply System plans to open bids Nov. 10 in Seattle for the $5 million Packwood Lake hydroelectric project.

One contract involves necessary construction while two others will cover equipment, according to R. W. Beck & Associates, consulting engineers for the system.

The construction contract calls for a concrete dam 37 ft high on Lake Creek, below the outlet of Packwood Lake, with a 17,000-ft 72-in. concrete or steel water conduit to the power house, 5,800 ft of 72-in. steel penstock and a 6,800-ft tailrace canal.

The supply contracts cover a 36,-700-hp Penton-type turbine, a 27,-000-kw generator, switchgear, switchboards, transformers, circuit breakers and switchyard equipment. The turbine will operate under an 1,100-ft head.

The project is the first construction undertaking of the system, an association of 16 PUDs. Bids will be called later for a 50-mile transmission line to connect the new development with the Bonneville power grid.

The development is opposed by the Washington State Game Commission, as harmful to fish in Lake Creek and Packwood Lake. Game Director John A. Biggs describes the project as the first attempt by power interests to dam "secondary" streams in the state.

"There isn't a stream in the state that couldn't produce 27,000 kw," Biggs declared. "Where are we going to stop?"

Hydroelectric Potential

About 95.3 million kw of potential hydroelectric power capacity were available for possible development in the U. S. as of Jan. 1, 1960, according to a report released recently by the FPC. This undeveloped capacity would have an average annual generation of about 361.7 billion kwh, it was stated.

Fifty-six per cent, or about 53.6 million kw, was in river basins west of the Continental Divide; 33,187,600

PUGET POWER line crews recently used their newly developed transformer truck while converting the 4,000-v line on 106th in Bellevue to 12,500 v to provide greater capacity for the area. The project required changing all transformers to new ones that could handle the higher distribution voltage. While this work was being done, customers were provided with electricity fed through the portable truck-mounted transformer. This piece of equipment was developed by Puget Sound Power & Light Co. at Renton

WWP CREWS used a crane with 100-ft boom and 40-ft log jib to set poles along its 50-mile distribution line the company has built from Grangeville to Elk City in north central Idaho. Line crews termed the job one of the toughest they have tackled in recent years. Elk City is being served with electricity for the first time. The Idaho community, deep in the Nez Perce national forest, is one of the few (if not the last) in the Pacific Northwest without central station service

kw of this in the Columbia River Basin. The Columbia River, with its tributaries, had the largest amount of undeveloped power of any river system in the country. The main stem had undeveloped power estimated at 10,726,600 kw and five of its tributaries had over one million kw each, namely: Snake, 13,061,300; Clark Fork, 2,765,100; Kootenai, 1,625,200; Cowlitz, 1,265,200; and Willamette, 1,122,000. Washington had the most undeveloped hydroelectric capacity—19,133,600 kw; California was second with 10,299,500 kw; and Idaho was third with 8,957,000 kw.

As of Jan. 1, 1960, the installed capacity of utility hydroelectric plants was 31,183,431 kw, with an estimated average annual generation of 163 billion kwh. Installed capacity at industrial hydroelectric plants totaled 729,412 kw, with average annual generation of 3.4 billion kwh.

Fifty-one per cent of the developed hydroelectric power in the U. S. on Jan. 1, 1960, lay west of the Continental Divide. The installed capacity in this area was 16,237,286 kw at 395 plants, with an average annual generation of 97.2 billion kwh. Washington, with installations totaling 6,272,626 kw, was also the nation's leading state in developed hydroelectric power; California again was second with 3,802,072 kw; and Oregon was third with 2,427,132 kw.

Bonneville Plans

Bonneville Power Administrator Charles F. Luce recently spelled out BPA's fiscal year 1962 construction program based on the public works bill signed by President Kennedy. The bill appropriated $33,080,000 for the year which began last July 1. The funds represent an increase of $3,073,000 over the year before.

Construction funds of $20,875,000 will provide transmission facilities for four new federal hydroelectric plants, four nonfederal plants and three new industries.

An increase of $918,000 in operation and maintenance funds will provide $12,205,000 to man the expanding BPA grid and related facilities.

Transmission construction for new hydroelectric plants include four plants being built by the Corps of Engineers, Hills Creek, Cougar and John Day in Oregon, and Ice Harbor in Washington. Facilities to carry out wheeling commitments will serve Rocky Reach, Mayfield, Carmen Smith and Wanapum.

"Line and substation projects are under way to serve industrial loads of the Cerro Corp.'s proposed aluminum plant at Wauna, Ore., Webb & Knapp Inc., a proposed steel mill at Anaconda, Mont., and plant expansion of the Harvey Aluminum Co.," Luce said.

COMMUNICATIONS

Systems Interconnected

Idaho Power Co. and Utah Power & Light Co. greatly improved their intercompany communications with the recent completion of an interconnection of their microwave systems.

Expansion of the Utah microwave system northward to provide various services for their generating stations and substations in eastern Idaho utilized a relay point on East Butte about 52 miles from Idaho Power's Brady substation, which is adjacent to American Falls power plant. Addition of a 150-ft tower and reflector at Brady made it possible to provide a path between the two points.

Three voice channels are in use between the companies for dispatching, general interoffice use, and an order wire to facilitate maintenance of equipment. Power interchange information between the companies is carried by some five telemetering channels from Brady to Utah's dispatching and load control center in Salt Lake City.

In addition to the above more or less routine functions, the microwave interconnection is used for a permissive transfer trip channel, which is a part of the relaying for the latest Idaho-Utah 230-kv tie line that terminates at Brady and Treasureton. Equipment is Motorola's latest version with stand-by and continuous power sources to insure reliability for relaying.

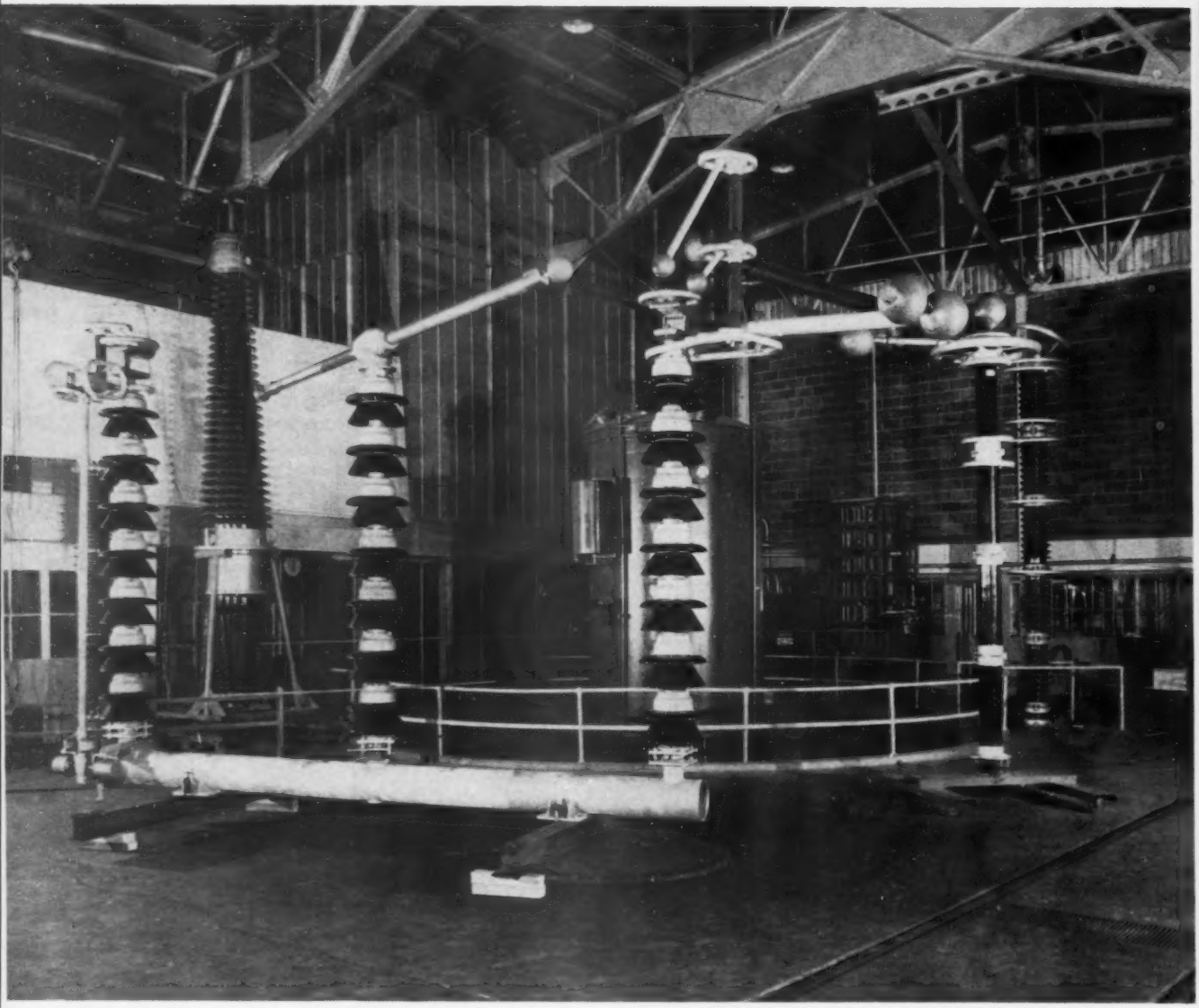
► **Probably it won't be worth-while for you to tilt your microwave dishes at the moon** and use it as a passive repeater. In addition to the great attenuation of the path, recent experiments by General Electric Co. and Bell Laboratories indicate that the moon makes a very poor wide band reflector. It was necessary to use single sideband fully suppressed carrier in order to obtain an intelligible reflected signal. These particular tests were conducted on frequencies in the vicinity of 900 mc, and at high power.

► **Telpac,** A T & T's controversial wide band communication channel offering, hit another snag when the FCC suspended the tariff for three months starting Sept. 8. The suspension is for the purpose of investigating the tariff to determine, among several other things, whether it will have a deterimental effect on private communications systems and also

TESTED AND PROVED!

SOUTHERN STATES RDC SWITCH

UNDERGOES BATTERY OF TESTS TO ASSURE TOP PERFORMANCE



SOUTHERN STATES RDC SWITCH undergoing tests in Ohio laboratory. Here this 345 kv unit was tested for visual corona, riv, and dielectric properties. From this laboratory the switch was shipped to Pennsylvania State University for further tests.

SS

Lengthy, expensive laboratory tests are necessary to make sure an air switch will perform satisfactorily at extra high voltages. Take the Southern States 345 kv RDC double side-break air switch, for example. Here are some of the most important tests involved:

Temperature Rise The RDC had to prove its ability to carry rated currents continuously without exceeding allowable temperature rise.

Visual Corona, RIV, Dielectric A high voltage laboratory was employed to make these tests. The results: no visual corona at 220 kv, the normal line-to-ground voltage for a 345 kv system. Not until voltage of 278 kv was applied did corona appear. When the switch was energized at 296 kv a radio influence voltage of 100 microvolts occurred. Dielectrically, the RDC passed all tests called for in NEMA's Publication SG6-1960.

Icing Pennsylvania State University performed a series of tests proving the capabilities of the RDC under severe icing conditions. (See photos at right.)

Momentary Current Amplitact contact construction as used on the RDC has withstood momentary currents up to 114,000 amperes without damage.

Those exhaustive tests, conducted in the nation's most capable laboratories, are extra assurance that the RDC will live up to expectations and then some!

WHY YOU CAN EXPECT BETTER PERFORMANCE OF THE RDC SWITCH AT HIGH VOLTAGES

The double side-break RDC switch has many inherent advantages over vertical-break switches, making it especially well suited for application at extra high voltages:

The switch blade is perfectly balanced on the rotating insulator; it does not have to be lifted for the opening sequence, a particularly significant advantage under severe icing conditions.

The contacts are better protected from ice accumulation by the overhang of the top contact housing, made possible because the blade swings in a horizontal plane.

The sleek design and configuration are important, too. The mechanism is enclosed in the streamlined, bronze housing located on the center insulator. There are no projecting arms, cranks or elbows to disturb its smooth, corona-resistant contours.

Hundreds of applications throughout the nation prove the capability and dependability of this sound, ruggedly-built switch. The RDC is suited for application at voltages from 34.5 kv to 460 kv.

Get full facts from your Southern States representative or write us for Bulletin 57RDC.

RDC IN CLIMATOMETER where it was exposed to freezing rain conditions. After ice coating averaging ¾-inches was deposited, ice was allowed to harden before operation. Photo at top shows the switch fully iced. Photo at bottom shows the switch after it was opened. Further tests were made to check the switch's ability to close under icing conditions. In both opening and closing tests the RDC operated satisfactorily.

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For phone number of closest representative see advertising index in back of book.

whether its low rate is actually compensatory to AT&T or is being subsidized at the expense of some of their other services. The investigation of Telpak had been requested earlier in the year by both Motorola and Western Union, who have now been given permission to intervene in the hearing. Some governmental agencies, the American Trucking Assn., Arinc, etc., have opposed the suspension as they were planning on making use of the facility. No doubt they will also be allowed to enter the hearing.

Tacoma System Approved

Construction permits have been received by the city of Tacoma for a two-hop 6-kmc microwave system to carry video information from the unattended Mayfield power house on the Cowlitz River to the load dispatcher's office in Tacoma. The hops are approximately 33 and 40 miles long and make use of passive repeaters-reflectors, that is, in simple words for the layman.

The load dispatcher will be able to read an instrument panel, annunciators and also observe the operation of the governor actuator. An interesting addition will be another camera in the switchyard, which will enable him to check the operation and position of blades on motor-operated disconnecting switches when giving clearances. The camera can also be remotely controlled for general surveillance in the yard.

This is the third application of ITV over an electric utility's industrial microwave system in the West, Southern California Edison Co. having the first, followed by Idaho Power Co. It will probably be the last using 6 kmc, according to a letter from the FCC that accompanied Tacoma's CPs.

► Just how the FCC intended to pursue its **local area microwave licensing policies** has been of considerable interest since the order was first formulated. As first implemented, and PG and E got the benefit of it, the policy looked pretty rough. NCUR investigated the matter from an engineering standpoint and presented a report to them, which resulted in some desirable modifications to the original policy. Joe Keller, NCUR's legal representative at 600 Munsey Bldg., Washington 4, D. C., has prepared a brochure that explains in detail the manner in which the FCC will require the use of 10-kmc frequencies for certain stubs. This has been mailed to microwave licensees.

NUCLEAR NEWS

AEC Compliance Offices

The AEC will consolidate licensee compliance inspections into five areas with regional headquarters at New York City, Chicago, San Francisco, Atlanta and Denver. The commission's division of compliance has staff responsibility for inspection of all commission licensed activities, including use of radioactive material and the construction and operation of licensed nuclear reactors.

Civilian Reactor Costs

The AEC has released the results of its ninth successive quarterly survey of costs for civilian nuclear reactor projects currently under active design or construction for installation in the U. S. Costs incurred for each quarter are listed below:

QUARTER ENDED	COST INCURRED (MILLIONS)
June 30, 1959	$47.2
September 30, 1959	43.6
December 31, 1959	60.3
March 31, 1960	51.2
June 30, 1960	59.5
September 30, 1960	47.2
December 31, 1960	60.4
March 31, 1961	60.6
June 30, 1961	54.7

These figures include costs for research and development, plant and equipment, fuel fabrication, land, training and waiver of use charges. Of the $54.7 million total for the quarter ending June 30, $50.2 million represented costs for electric power prototypes and experiments. The remaining $4.5 million were for research and test reactors and the N. S. Savannah nuclear reactor propulsion plant.

Of the $50.2 million for civilian power projects, $22.6 million represented costs to publicly and privately owned utilities and $27.6 million to the commission.

Gas Centrifuge

Garrett Corp., AiResearch Mfg. Division of Los Angeles, has been selected by the AEC to conduct a research program aimed at development of an advanced gas centrifuge for separation of uranium isotopes.

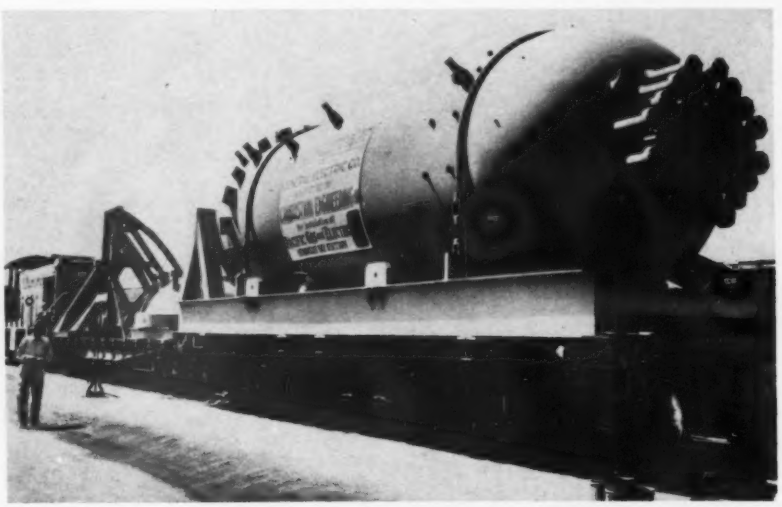
The selection of a contractor for the advanced gas centrifuge is part of the commission's over-all research and development program to further the technology on uranium separation by this method.

Fuel Fabrication

A new method of fabricating nuclear fuel rods and reactor control rods by sound vibrations has been announced by General Electric's atomic power equipment department, San Jose, Calif.

The technique, known as vibratory compaction, is said to be faster, more efficient and less expensive than previous fabrication procedures.

A pilot production line is now being established at this fuel facility.



THIS STEEL REACTOR VESSEL, weighing 132 tons, recently arrived at Pacific Gas and Electric's Humboldt Bay atomic power plant. The vessel, heart of the plant's nuclear system, is 42 ft long and nearly 11 ft in diameter and has walls 4½ in. thick

WHEN THE FUTURE IS ALL-ELECTRIC

WHY BUY ANYTHING BUT A TOTAL-ELECTRIC GOLD MEDALLION HOME?

Burton Romburger, Architect, and Mrs. Romburger enjoy all the benefits of total-electric living in their new Gold Medallion Home at Newport Beach, California. Clean, quiet electric heat, and abundant, well-planned lighting make their home completely comfortable.

Mrs. Marvin Wagner of Beverly Hills enthuses, "You can't go wrong with electric cooking!" The Wagners have two flameless electric ovens—cook entire dinners in them. Electric oven cookery keeps juices in meats—makes them more tender, tasty.

All-electric kitchen in the Gold Medallion Home of Dr. & Mrs. Walter J. Nowers, Palos Verdes, California. Mrs. Nowers finds electric range-cooking is cooler, faster, and gives her exact control of cooking temperatures. Gold Medallion Homes have full "Housepower" wiring—ready for the all-electric future.

SOUTHERN CALIFORNIA Edison COMPANY

Penelec picks Electro-Motive

Sixteen miles from Dushore, in northeastern Pennsylvania, Pennsylvania Electric Company has installed its first 4000 KW Electro-Motive Diesel Peaking Plant to provide a reliable secondary source of power, and to improve service continuity to customers in the immediate area.

PEAKING POWER—In addition to providing area protection for Penelec, the Electro-Motive Plant will also operate automatically and unattended as a peaking power generator during hours of greatest demand. It is remotely controlled from Penelec's East Towanda Dispatching Center 29 miles away.

AUTOMATIC DEAD-LOAD PICKUP—In the event of an emergency power failure on the line, the Electro-Motive Plant will automatically start, come up to full speed, synchronize and pick up the area load, within 90 seconds. It will continue to provide emergency power until the line failure is corrected and will then automatically shut down.

POINT-OF-LOAD POWER—Because the Electro-Motive Plant operates automatically and unattended, Penelec was able to place it conveniently at the point of load demand for maximum savings in generation and distribution equipment investment. The compact, portable Electro-Motive equipment operates quietly and smoke-free, making it a good neighbor.

ADAPTABLE TO ANY SYSTEM—The inherent design characteristics of the Electro-Motive equipment on the Penelec system that make it

Diesel Plant for area protection

ideal for area protection and peaking power, also make it well suited for many of your system requirements:

- fast start for spinning reserve
- automatic dead load pick-up for area protection
- unattended operation for remote peaking service
- portability for simple installation
- freedom from damage to components caused by rapid thermal changes occurring from start to full load.

Available in units from 2000 KW to 10,000 KW, the Electro-Motive peaking equipment line contains both Diesel and dual-fuel plants that permit matching the plant to exact requirements for the most economical and efficient operation at the lowest investment. Ask your Electro-Motive representative for complete details.

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MARKET DEVELOPMENT

Officers installed at bureau conference for the coming year: Robert L. Covell, second vice president; A. R. "Tony" Combs, immediate past president; Mrs. Wilma Furstenfeld, president; H. R. Ascher Jr., first vice president; Jerry Heilbron, treasurer

Wilma Furstenfeld Installed at San Diego Bureau Conference

Mrs. Wilma Furstenfeld was installed Sept. 28 as the first woman president of the Bureau of Home Appliances of San Diego County.

Mrs. Furstenfeld, appliance sales director at Benbough's, succeeds A. R. Combs. She was installed by E. W. Meise, first president of the organization, at the bureau's annual fall conference, which also celebrated its 29th anniversary.

Other new officers are H. R. Ascher Jr. and Robert Covell, vice presidents, and Jerry Heilbron, treasurer.

The conference, attended by 300, heard William E. Quirk, vice president and general manager of Pacific Telephone Co.'s southern counties area, describe an ultimate plan for 50 communications satellites to orbit 7,000 miles above the earth.

Quirk said the network would be used to transmit telephone, television and other communications data. He predicted telephones would triple in the United States within 20 years and the number of long-distance calls would increase by five times.

A panel of city and industry leaders participated in a discussion of the economic outlook in San Diego County.

Range Program

A hard-hitting electric range sales program is being conducted by Southern California Edison Co. and electric appliance dealers throughout the company's territory. Theme of the campaign, which began Sept. 15 and will continue through Dec. 15, is "You will like flameless electric cooking because it's clean . . . it's cool . . . it's economical." According to J. H. Mead, Edison vice president, hundreds of participating dealers are offering special reduced prices on electric ranges to give their customers maximum incentive to buy during the three-month promotion. Edison is backing them with an advertising campaign which will provide an estimated 10 million individual selling messages.

FARM ELECTRIFICATION and its benefits were brought before crowds attending the Utah State Fair in Utah Power & Light Co.'s display area, a large tent with a red barn front. One of some 30 exhibits in this area, the model shown was built by Paul W. Petersen, project leader, farm electrification, at Utah State University, and is available for other similar events. Sponsors, in addition to Utah State, are UP&L, Telluride Power and California Pacific Utility Co. At left, Petersen points out a detail to Lamar Holt, UP&L residential and farm director, who is in charge of the utility's Farm Better Electrically activity at the fair

PEOPLE

Erdahl Named at Tacoma

Cliff Erdahl will become Tacoma utilities director Nov. 1, following his appointment by the utility board. He succeeds Dean Barline, who died Feb. 12.

Erdahl left a business career to serve as city utilities commissioner, an elective position, from 1944 to 1953, when the post was abolished with the city's adoption of a new charter. He continued to run the utilities department, as acting director, until the new utility board appointed Barline in early 1954. He retained his interest in power matters, first as chairman of the Pacific Northwest Utilities Conference Committee and since 1958 as a public relations consultant. A. J. Benedetti, acting utilities director since Barline's death, is expected to return to his position as water superintendent.

► **Eugene C. Starr** has resigned as chief engineer for Bonneville Power Administration effective Oct. 30. **E. L. White,** deputy chief engineer, will assume his duties until a new chief engineer is chosen, according to Administrator Charles F. Luce. Starr, who has served BPA either as a consultant or chief engineer since 1939, said that his resignation was for "reasons of a personal nature." He added that he would announce his future plans later.

Starr

► **Ellis B. Langley Jr.** succeeds **George P. Cornwell** as Humboldt Division commercial manager, Pacific Gas and Electric Co. Cornwell was recently promoted to the Stockton Division. Langley was formerly in the Coast Valleys Division at Salinas where he was sales supervisor.

► **Durwood W. Hill** has been named manager of the Clark County PUD effective Nov. 1. He succeeds Vincent M. Cleaveland, who resigned in August. Hill has been manager of the Tillamook PUD in Oregon for nearly five years.

► **Glenn A. Wymore,** a San Pedro attorney, has been elected president of the five-member Los Angeles Public Utilities & Transportation Commission appointed by Mayor Yorty.

Brandon

Morong

Pierce

Alexander

► **Walter O. Woodward** has been promoted to the post of superintendent of Pacific Power & Light Co.'s Wyoming Division. He had been assistant personnel director at the company's Portland headquarters office and also had served the company as Portland district engineer and assistant district superintendent. His new headquarters are in the division office in Casper, Wyo.

Woodward

Puget Power Personnel Changes

Puget Sound Power & Light Co. has announced personnel changes in its operating department.

John E. Makovich has been made director of safety. Fred R. Starrett was made safety supervisor for the Western Division in addition to his responsibilities for the Southern Division. Robert Tuckness was made supervisor of safety for the Central and Northern Divisions.

David H. Knight, former superintendent of system operations, was made manager of power system operations, and Eugene L. Bush, power planning engineer, was assigned as manager of power planning. Lawrence H. Hall, assistant to the manager of operations, was made executive assistant to the vice president-operations.

Two new superintendents were named. They are Clifford G. Johns, superintendent of general services, and Walter R. Miller, superintendent of system protection. George L. Artus, formerly superintendent of the division of power supply, was given the new title of superintendent of power production.

Kenneth L. Harvey, meter department supervisor, was named coordinator of operations, and Peter A. Messer, services supervisor in the Northern Division, was made supervisor of meters and transformers.

Salt River Appointments

Promotions and reassignment of departmental responsibilities have been announced by R. J. McMullin, general manager of the Salt River Project.

G. W. Brandow, formerly assistant general manager for the Salt River Power District, was appointed to the new position of associate general manager. He will be in charge of power operations, transmission, distribution, engineering and construction.

L. M. Alexander, formerly assistant general manager, was promoted to the new position of associate general manager-planning and power services.

T. M. Morong was named assistant general manager and chief engineer for the power district. He will continue in his present capacity as chief engineer and will report to Brandow.

V. A. Pierce, formerly manager of community and special services, has been made assistant general manager-community relations and power sales.

► **Van R. Wilder** has been appointed superintendent of Pacific Power & Light Co.'s Lewis River Power District, with headquarters at the Merwin plant.

► **Roy Blanchard,** purchasing agent and traffic manager for Public Service Co. of Colorado since 1950, died in Denver after a long illness. He was 67 years old. Mr. Blanchard had been with Public Service Co. since 1923 when he started as bookkeeper and cashier at Cheyenne, Wyo. He recently was presented with the Boy Scouts' Silver Beaver Award for distinguished service.

► **Theodore S. Lisberger,** 45, son of veteran S. J. Lisberger, retired PG and E engineer, died in Albany, N. Y., Sept. 1. He was also an engineer with a bachelor's degree from Massachusetts Institute of Technology in 1938 and was an executive of G-E's management training program.

ELECTRICAL WEST

VOL. 127 NO. 5 NOVEMBER 1961

THE MESSAGE FROM HOME IS CLEAR

In the process of our government, the Congress has decided (1) not to appropriate the $95 million necessary to install generation at the Hanford NPR site and (2) to appropriate $4.7 million for controversial transmission lines on the Upper Colorado River storage project. Let's look behind the obvious to measure the real score.

The first clear point is that $4.7 million is a mighty long way from the $135 million required to build the master-plan system. Even the $4.7 million is not a clear victory for federal power. There can be no question that the intent of Congress is for the Secretary of the Interior to make an earnest and proper effort to negotiate wheeling agreements with the private companies prior to committing these monies. Congress is saying in effect: "Here is the money, go ahead, but only if there is no other reasonable way to achieve the end."

The Senate mandate is unmistakable.

Mr. Dirksen: *(On the question of the meaning of the conference report) . . . there is a duty on the part of the Secretary to determine whether the matter can be workably done through the utilities, and then, if for any reason, it cannot be done, he will be free to pursue the matter in another way. Is this correct?*

Mr. Ellender: *I am certain the Secretary of the Interior will take that matter into consideration and no doubt make an effort to get the private utilities to construct the lines, if at all feasible.*

In the statements, Congress is rightly expecting the administration officials to bargain in good faith. If they do, we have little question but that the American taxpayer will quit winner. Little if any of the $4.7 million will be spent, the joint system which the private companies have championed will become a reality. But how reasonable is it to expect this to happen?

As a starting place, we must recognize that the President, Mr. Udall and Mr. Dominy have publicly supported public power in any form and transmission schemes in particular. The pressures applied to congressmen by the administration during the final phases of the debate underline the administration's determination in the matter. **They would clearly like to make a token negotiation, find a reason to sandbag it, and go merrily on their way.**

The contrast between legislative intent and administration goals becomes clear by Secretary Udall's recent statement (see p 47):

I think I can simply say at this time and I would rather not discuss specific lines—in fact I will not—but there are certain ones we consider backbone and I don't think these are open to negotiation . . . I know this is rather muddy . . . but we will just have to leave it that way.

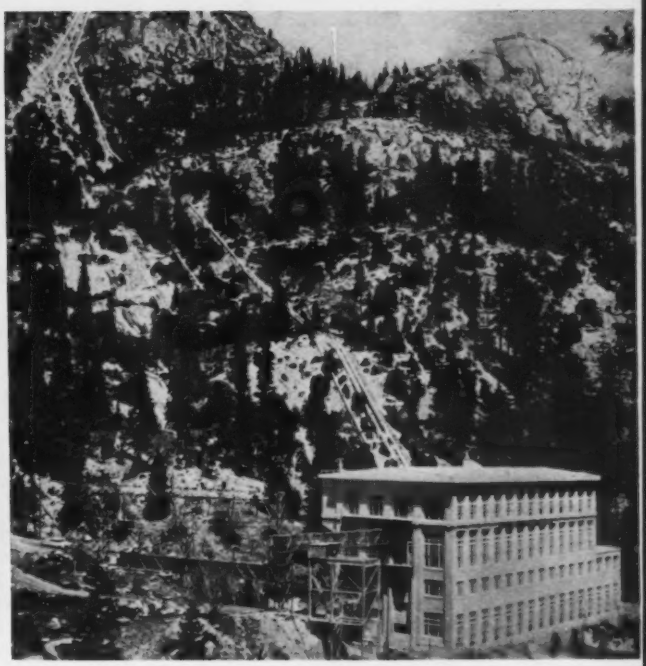
On the block is the integrity of the Congress of the United States. These men are wearying of an administration that governs by bludgeon and of public officials building empires at taxpayers' expense.

They are hearing more from the folks at home and the message is clear. "Responsibility and thrift." "Spend for defense—save at home." "Don't use my money to buy votes."

Unless there is fair bargaining, we suspect that the Congress in its wisdom will withhold future monies.

Finally, there is the personal positions of the individuals—Messrs. Udall and Dominy. Neither of these men can submit their reputations to much more question and continue to be an asset to the President. Politics is a tough racket, and it is doubtful whether either of these men want to be a human sacrifice to the god of public power.

While there is much to be thankful for, there is much hard work ahead.



The old is contrasted with the new in these pictures. At left is Edison's new Mammoth Pool power house, which has a generating capacity of 126,000 kw. At right is an older hydrogenerating station, Big Creek No. 1, with a capacity of 81,000 kw

POWER PLANT SIMPLIFICATION

A. B. CHRISTIE, SOUTHERN CALIFORNIA EDISON COMPANY

The upward spiraling of construction costs is a challenge to the engineer who is accountable for planning and designing generating stations. The designer must provide a design that is economical, and still meet rigorous standards for continuity of service. For every component he considers for his design, he must answer these questions:

1. Why is it needed?
2. Is there a better way?
3. Is it adequate?
4. Is it economically justified?

Only by so doing can he cope with the rising costs and arrive at a good design.

Hydro Stations

Much progress has been made in the simplification of hydro station design. The one-line diagram of Big Creek No. 4 is shown. This power house was designed about 11 years ago as an attended station. At the time this station was designed, it was thought to be necessary to provide a stand-by oil circuit breaker for the two generator breakers and to provide a breaker to connect the station service transformer bank to the transformer bus. The 240-v station switchgear was double bused and fed from three possible sources: (1) from the station service generator; (2) from the station service transformer bank off the main transformer bus; (3) from the station service transformer bank off the 12-kv distribution system. It should be noted that three-phase transformers were not used.

In contrast, the one-line diagram of Mammoth Pool shows the company's latest hydrogenerating station design. This station has two 66,000-kva generators and is supervisory controlled from a nearby power house. The control scheme is semi-automatic in that after initiation of a start or stop signal by the remote operator, the automatic sequential control system completes the operation. Loading of the units is by area load frequency control equipment. Selective telemetering indicates speed and flow.

Closed circuit television enables the remote operator to observe the control board and read instrumentation that is not telemetered, such as pressure gages, kwh meters and others. Identification of an alarm position is also made via television by viewing the annunciator panel. Two cameras are provided, one in the control room and one outside overlooking the generators, transformers, penstock and yard area. Selection of the cameras is by supervisory control and each has remote control of pan, tilt and lens.

A microphone in the turbine room permits the remote operator to listen to the turbine. This facility has been a valuable tool at this and other installations.

Communication channels for the supervisory control, telemetering, television, sound monitoring and voice were established via a microwave link. As the control system

was designed to be fail-safe, the station service bus is considered adequate as the power source for the microwave equipment. A voltage-regulating unit is used in the feeder to the supervisory and microwave equipment.

There are no 220-kv oil circuit breakers at the power house. The transformer differential will trip the breakers at the receiving end of the 220-kv line by transfer trip relaying. Since the receiving station is not the same as the controlling station, the microwave link cannot be used for the transfer trip. A transistorized, frequency shift power line carrier is used for this function. Security against false trip-out is obtained by use of permissive relays. A small, separate battery is the source of power for this carrier, which avoids exposing the transistors to the voltage surges of the main battery system.

Each generator unit is connected to a three-phase transformer rated 75,000 kva. These transformers are forced oil-air cooled, type FOA, and are sized to allow for the overload capability of the turbine and generator. Air blast breakers rated 1,500 mva between the generators and transformers are used for synchronizing.

All station auxiliary power requirements are served from 240-v switchgear. The normal power source will be a three-phase transformer connected directly to one of the main transformer buses. Automatic transfer is provided to the transformer supplied from the 12-kv distribution line. The transfer scheme is self-restoring.

The upper penstock gate is operated by bottled, high pressure nitrogen.

There are several "firsts" for a major hydro plant of Southern California Edison in this station such as:

1. No 220-kv switching at the station—transfer trip is used.
2. Three-phase main transformers rated 825-kv BIL — no spare transformers.
3. Supervisory control via microwave.
4. Closed circuit television used for remote monitoring.
5. Single 240-v station service bus.
6. Air blast circuit breakers and no stand-by breaker.

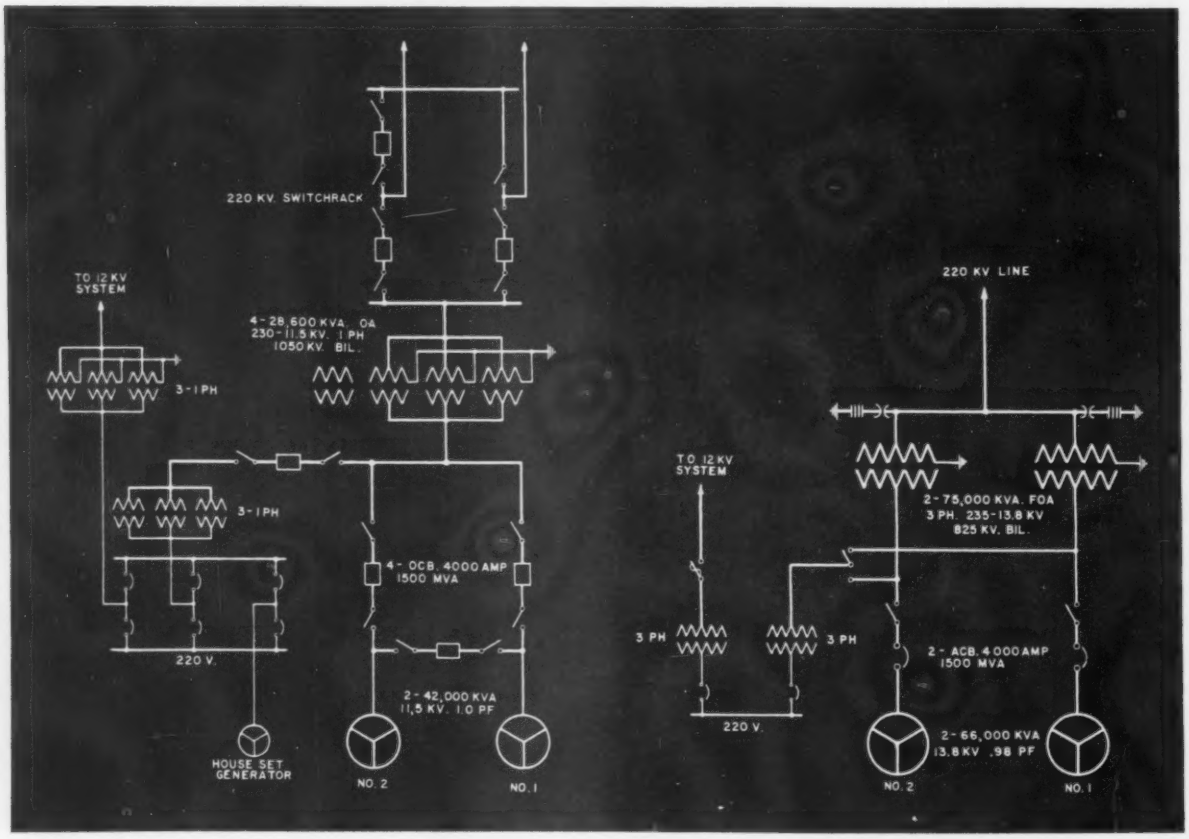
Such an arrangement for a major hydrogenerating station could hardly have been considered 10 years ago. This simplification in station layout and control is indicative of the many improvements and new developments made by manufacturers of apparatus for generating stations during the past decade. Successful application of new developments and ideas can only be accomplished through the closest coordination between the designing and operating engineers.

Steam Stations

The electrical design of Huntington Beach and Mandalay steam stations also is a case in point.

On the basis that a chain is no stronger than its weakest link, every component has been built for a uniform and high degree of service reliability.

The electrical features of these units were, for all practical purposes, identical. This similarity permitted substantial savings in engineering and material procurement costs. However, repetitive design does not invite progress. Therefore,



One line diagrams show electrical design of Big Creek No. 4, left, and in contrast Mammoth Pool power plant, right

Parabolic at remote station is mounted on side of power house. Signal is being directed to ridge top passive reflector

a closer critical look was required.

A review of the need for a spare exciter m-g set for Mandalay raised the question of whether spares were economically justifiable in view of the excellent performance of modern exciters. Each 128,000-kva generator at Huntington Beach and Mandalay has its own motor-driven exciter, and enough spare exciters were found in various stations with sufficient capacity to cover the exciter requirements for all units up to and including Units No. 3 and No. 4 at Huntington Beach. One of the spare exciter m-g sets was converted to a portable spare mounted on a trailer. *This arrangement saved more than $90,000 for each cross compound unit.*

The one-line diagram shows the Huntington Beach auxiliary power system as installed for Units 1 and 2 and for Units 3 and 4.

In planning the auxiliary power system for Huntington Beach Units 3 and 4, it was found that the system could be simplified. Elimination of the spare motor-driven exciter and the decision to use a shaft-driven main boiler feed pump and a motor-driven reduced capacity start-up pump made it possible to eliminate bus sectionalizing breakers. Also, a 480-v reserve transformer for these two units could not be justified. The reserve 480-v transformer for Units 1 and 2 could double as a spare for Units 3 and 4. *The transformers of this classification have proved to be highly reliable, indicating that this change will not jeopardize continuity of service.* The amount saved by this simplification of the auxiliary system is in the order of $60,000 for the two units.

The company's basic requirement for a steam station auxiliary power system is that it must be capable of riding through a 20% voltage dip of 15 seconds' duration at the generator terminals and recover without causing the unit output to drop below rated output. Tests have shown that a system so designed will maintain rated unit output down to 55 cycles.

The 480-v source is used for motors 300 hp and smaller and 4,160 v for motors larger than 300 hp.

The auxiliary power transformers are sized to meet the following requirements:

1. The unit 4,160-v transformer shall have sufficient capacity to carry the auxiliaries of one unit partially loaded, while supplying power for restarting its companion unit in the station after a momentary shutdown.

2. The reserve (start-up) transformer shall have sufficient capacity to carry the auxiliaries of one unit at approximately full load while another unit is started from cold standstill.

The reserve and unit 4,160-v power sources are in phase, and transfer from one source to the other is normally made by parallel-and-drop operation. In case of loss of the unit 4,160-v bus, an undervoltage relay will automatically transfer the 4,160-v system to the reserve bus.

The switchgear has sufficient capacity to withstand the duty imposed by either the unit transformer or the reserve transformer, whichever is the higher. Motor contribution is also considered. For all Huntington Beach and Mandalay units the 4,160-v gear is rated 250,000 kva and the 480-v gear is rated 35,000 amp.

Centralized control system is used, with one control room for each pair of units.

Automation was included in the design of Units No. 3 and No. 4 at Huntington Beach. Start-up and shutdown operations are supervised by a computer through stored programs. Control functions such as combustion control, speed matching, synchronizing, etc., are performed by conventional and proved control loops. Loading of the units is accomplished by the automatic area load frequency control equipment. The computer provides scanning and data processing with print out on demand, providing the operator with the unit heat rate, boiler efficiency and any other pertinent operating information. Any control point that drifts outside the limits stored in the memory unit is identified and the actual value of the reading is printed out. The power source for this equipment must be uninterrupted and closely regulated. A m-g set is used with an a-c motor as normal drive and a spinning d-c motor as emergency drive.

At the present time the computer is used only for scanning, with further testing continuing on weekends for the balance of the control system. The system should be fully automated by the end of this year.

It is believed that the final adjustment of this automatic control equipment will result in more efficient operation and better supervision of apparatus, which means better service.

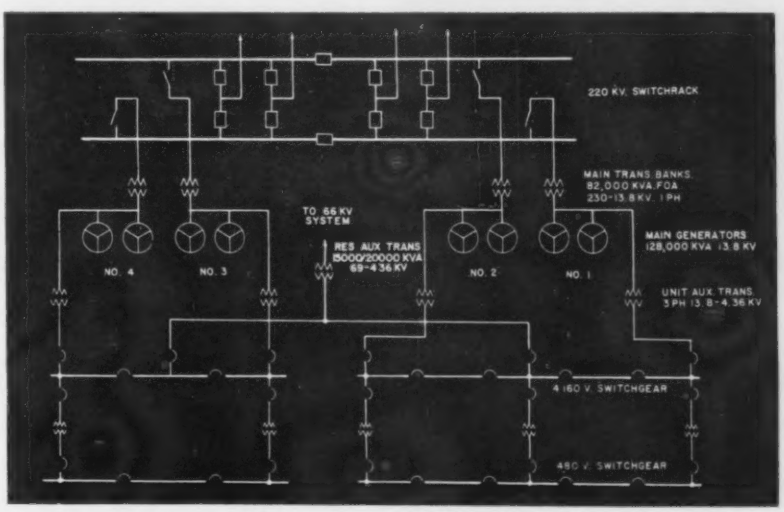


Diagram of Southern California Edison's Huntington Beach auxiliary power system

An approach to standardization of some of the components in the field of residential underground

12-kv Wye Residential Underground Systems

J. H. LAWSON
PACIFIC GAS AND ELECTRIC CO.

The piece of equipment that makes this system "tick" is the specially designed transformer-cabinet combination installed on a precast concrete pad. A concrete box is under the pad to allow for slack in primary cable

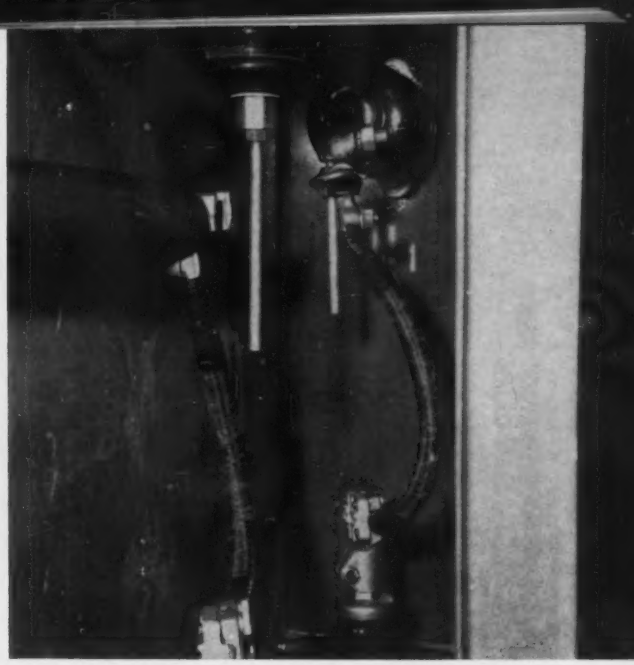
The author inspects completed cable terminations cabinet with temporary back plate installed. Also note pad for transformer

On the Pacific Gas and Electric Co. system, the standard primary voltage on which most new growth is being taken is 12,000-v wye, grounded at the substation, with three wires carried into the field. The circuit arrangement for residential underground areas, using this primary voltage, consists of a single-phase loop between risers, connected to overhead lines through fused cutouts or switches, and opened at the approximate midpoint of the loop. The single-phase line usually consists of two insulated phase conductors. However, if the area to be served is of sufficient size and close to a substation, it may be economical to provide a 12-kv neutral, avoiding the second insulated conductor. Means are provided for sectionalizing the primary circuit at each transformer cabinet installation but arrangements for tying secondary mains together are not provided.

All primary and secondary cables are installed in conduit near front property lines in the parkway area or under the sidewalk. The use of a joint trench with a telephone is always considered.

The piece of equipment that "makes this system tick" is a specially designed transformer-cabinet combination installed on a concrete pad. At the early stages of development, all existing designs of pad mounted transformer-cabinet combinations were for use on the more common four-wire, 12-kv systems (7,200 v single-phase). A new design therefore had to be made, and this was done jointly with a transformer manufacturer. The transformer portion can be replaced without disturbing the cabinet.

The cabinet is divided into two sections, one containing secondary terminals and breakers handle attached to the transformer and the other containing two high voltage bushings attached to the transformer and two primary standoff insulators attached to the top of the cabinet, used for sectionalizing. The cabinet has provisions for four potheads but stress cone termina-



Left, primary and secondary compartments with covers removed. High-voltage compartment has additional insulated barrier with danger sign that must be removed. Right, sectionalizing of de-energized circuit being accomplished with a "shot gun" stick

tions have also been used.

Considerations that influenced the design of this system were: (1) interchangeability between transformers and cabinets of different manufacturers; (2) continuity of service comparable to that furnished by an overhead system; (3) sectionalizing to be accomplished by an overhead troubleman; (4) safety requirements allowing for installation, maintenance and operation within scope of existing rules and instructions; (5) use of standard existing components wherever possible; (6) use of either pothead or stress cone termination of primary cable; and (7) cost and size to be kept to a minimum.

1. **Interchangeability** – It was decided that the transformers and cabinets should be made separable and that either could be interchanged with cabinets or transformers supplied by different manufacturers. This decision was made for two basic reasons: (a) to minimize the number of spare transformers in stock; and (b) to allow for deferring installation of transformers when homes were not yet built.

2. **Continuity** – It was felt that residential customers should receive the same degree of continuity of service, whether served overhead or underground. This criterion required a loop system (alternate primary feed), since location and repair of faulted cables can take hours.

3. **Sectionalizing** – Residential underground areas are often located many miles from downtown areas where underground crews are normally located. If fast service restoration is to be accomplished, it must be done by the troubleman located in the residential area. If one man is to sectionalize, the primary door must be light enough for him to remove, and sectionalizing must be accomplished by use of tools available to the troubleman.

4. **Safety** – It was agreed that no special safety rules or instructions would be made, and no "bending" of existing rules would be allowed in order to fit a special transformer-cabinet design. Specifically, those rules which most apply are: (a) visible open at sectionalizing point; (b) test cable dead before grounding; and (c) ground cable prior to work.

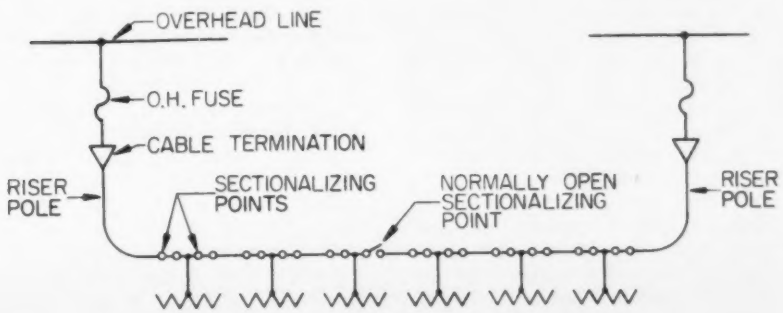
5. **Standard Components** – Pad mounted transformer installations are a new concept; therefore, the preference was not to further complicate things by use of nonstandard or newly designed components. Wherever possible existing standard components were used.

The primary cable used is paper and lead, however, nonleaded cables work equally well. The secondary cables are rubber-neoprene.

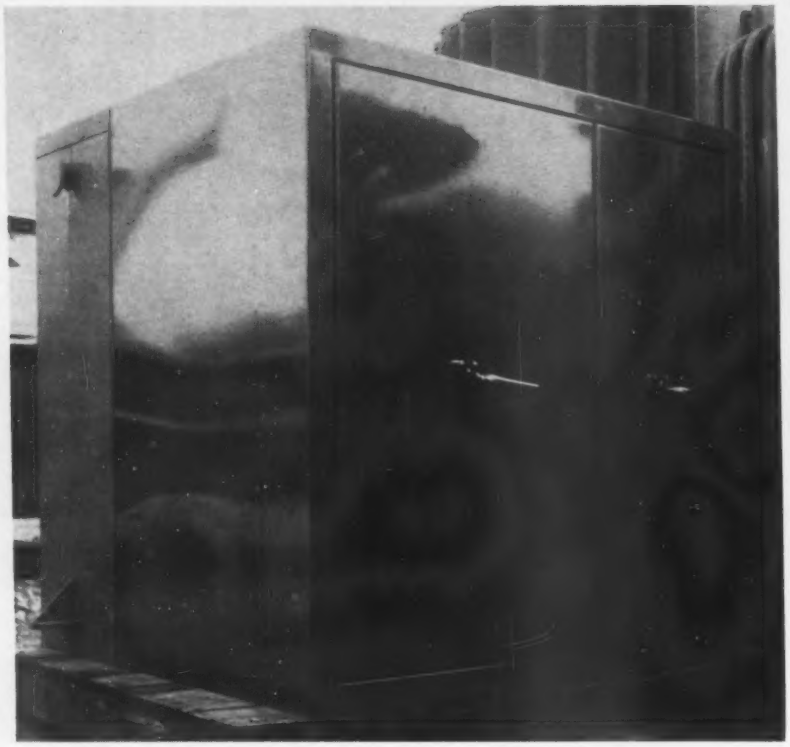
6. **Terminations** – Primary cable on a 12-kv system costs twice as much as on a 7,200-v system. The type of cable used, therefore, has significant economic importance.

7. **Appearance** – Bearing in mind that a pleasant appearing, safe and yet low cost residential underground system is the goal, cost and physical size were to be kept to a minimum.

Once it was determined that a loop system was necessary, the pad-mounted transformers and cabinet had to provide for looping of primary cables in and out of the cabinet, and also for attaching the transformer to either alternate primary feed. This could be accomplished in several ways and each way has its price: (a) load break switches in oil, either inside transformer or in an oil chamber in primary compartment; (b) either load



One-line diagram of typical primary loop circuit shows how loop sectionalizing is accomplished using stand-off insulators



Primary and secondary compartment of one manufacturer coordinates perfectly with transformer of another manufacturer

break or nonload break switches in air; (c) no switches, sectionalizing to be made by moving cable jumpers with circuit de-energized.

In a 12,000-v transformer cabinet, four sectionalizing points and four terminations are required as compared to only two in a 7,200-v cabinet. This one important fact seriously discouraged the use of either oil or air load break switches. In addition to the higher cost and larger size, grounding provisions and safety requirements were difficult to meet in some designs of load break or nonload break switches.

In deciding between a load break or a nonload break sectionalizing unit the following points were considered: (a) the time between circuit failure and arrival of operating personnel is the same regardless of the type of sectionalizing used at each transformer; (b) sectionalizing is also required for prearranged work, such as transformer addition or change out. However, outage time when work is prearranged can be reduced to a minimum and a time can be chosen that will cause the least inconvenience to customers. Where possible, secondary cables may be laid on the ground to provide temporary power.

The third type of sectionalizing—moving jumper cables with circuit de-energized—was selected. It has the disadvantage that any sectionalizing requires de-energizing at least one-half of the primary loop, but it best complies with the seven criteria mentioned earlier.

In this system a secondary cable failure will trip the breaker in the transformer. Transformer failures will clear at the internal primary fuse if it is coordinated with the fuse on the riser pole. Primary cable failures will blow the fuse at the riser pole resulting in outage of one-half of the loop.

Once the open-type design was decided upon, the particulars had to be worked out with a transformer manufacturer. The two stand-off insulators were located at the top of the cabinet and the insulating barriers were added to reduce strike distances where possible. The depth (or thickness) of the transformer increases with the kva size. Probably the most difficult requirement was the necessity of one specified method of joining the cabinet to the transformer, particularly at the top. This is not completely without precedent as EEI-NEMA specifications for network transformers show dimension details of throat connection of transformer secondary.

Consideration was given to the use of nonseparable cabinet and transformer. This too would require some degree of standardization since not only the bolt spacing on the concrete pad but also the height of the primary bushings and stand-off insulators, strike distances, and so forth would need to be standardized if primary potheads were used. It would not, however, need the joining requirements between cabinet and transformer.

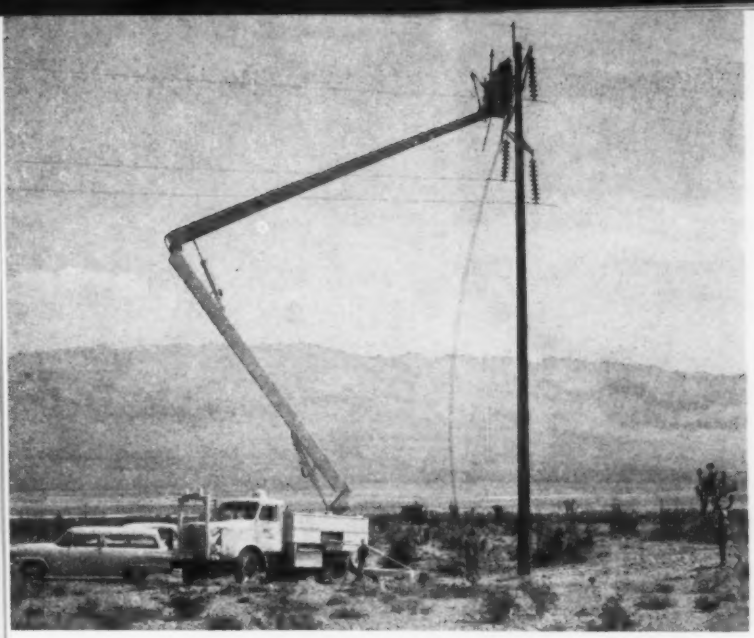
It should be emphasized that the primary coil of these transformers is 12,000 v, not 7,200 v. Three-wire 12-kv systems are fairly limited and found mainly in California.

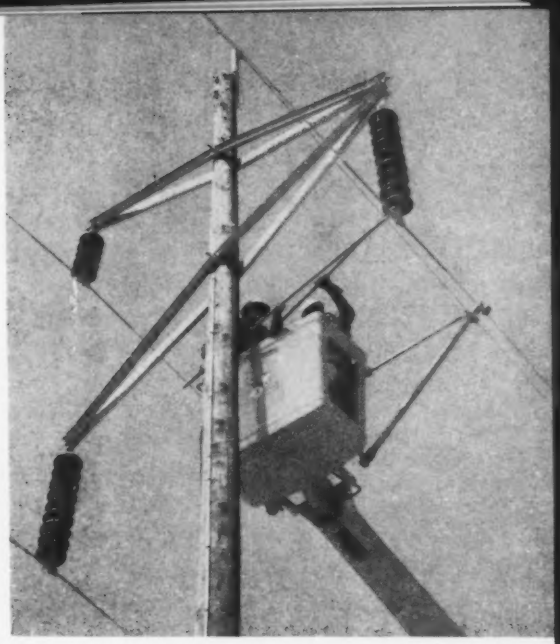
Recently a number of California utilities who operate lines of this voltage collaborated in preparing an "area standard" which could be used by all of them to mutual advantage. The PG and E standard was modified to conform to this area standard, which was based on the same principles. To date, four utilities have purchased or placed on order transformers and cabinets in accordance with this "area standard."

It is recognized that when the utility spells out the dimensions of the transformer-cabinet combination, certain inherent disadvantages appear. It gives only limited freedom of design to the manufacturer and tends to freeze design. Major improvements, of course, would be incorporated.

Industry-wide standardization of pad mounted transformer-cabinets is a necessity and should be done as quickly as possible. However, this appears to be a staggering problem. Different types of systems, different voltages, different safety and operating rules, different sectionalizing means (oil, air, load break, nonload break), not to mention color, type cable used, and just plain preferences all have to be reconciled. If more time is used to allow these things to shake down, more types of transformer-cabinets will appear (necessitating even more spares and replacements), more utilities will enter the fray and the likelihood of a weak standard (with many options) will increase.

Area standardization of the transformer-cabinet previously described is being used in an effort to prevent a large number of types, designs, and so forth being installed, which would result if some degree of standardization were not used. Hopefully, someday pad mounted transformer-cabinets will be standardized on an industry-wide basis. Until that day arrives, the use of this design will prevent a multitude of designs from being installed on the systems where it is applicable.





Crew foreman and a lineman rode ahead to pick the most logical spot to park truck. Hot sticks attached to basket support the cable

EXPEDIENT REINSULATION

W. H. HANDLEY AND D. E. PIKE, NEVADA POWER CO.

With the new method, four men have reinsulated 15 structures in one day including routine line maintenance—a 300% increase in productivity

One of the many lines operated by Nevada Power Co. is located between Las Vegas and Mercury at Nevada Test Site, the AEC installation where nuclear research is conducted. The line was designed and constructed originally to 138-kv specifications, including dead-ends and heavy-angle structures. Tangent structures were insulated at 69 kv. Increased load demands at Nevada Test Site required that the voltage be increased to 138 kv, necessitating the addition of four insulators to each string on each structure along the 84-mile line.

The line site is a remote desert area north of Las Vegas about 100 miles east of Death Valley. Temperatures range from 20 to 115 F, and wind velocities reach 90 miles per hour.

Using a 65-ft Strato-Tower mounted on a FWD truck, a new technique in hotline handling was introduced. Instead of using the hotsticks from the pole, or the bare hand method from a basket, the Strato-Tower did most of the work.

A specially designed basket was equipped with hotsticks on each side. These tools had rubber-padded hooks to avoid damage to the aluminum conductors.

The Calavar Corp. of Los Angeles, in conjunction with the power company's line department, designed the basket and assisted in the adaptation of these special hotline tools. Calavar also worked with the staff in the field to determine an efficient operating method.

At each structure, the crew foreman and one lineman rode ahead of the tower to preselect the most logical spot to locate the truck in order to permit the three strings of insulators to be replaced from one truck location. This sped up the crew's operation considerably.

As the tower was raised between the energized conductors, the hotstick hooked onto the conductor. The two men in the basket used hotline tools to release the cotter key coupling the conductor to the insulator. Using the tower for support, the freed conductor was moved out of the way. The men, who were then directly under the insulator, brought up the additional ones and tied them to the original string.

At this point, the tower supported two men, tools and the full weight of the conductor between each span. Again using the tower controls, the conductor was brought back into position and attached. In addition to reinsulation of the three conductors at each structure, there were cases when steel brackets were added to the end of the crossarm to prevent the conductor from swinging into the arm from the force of the desert winds. In the other cases, structure members were affixed atop the pole to permit helicopter crews patrolling the line to pinpoint troubled areas to the exact pole.

Before placing this new Strato-Tower in operation, the most a crew of five men completed in one day was seven structures. With the new equipment and method, four men have reinsulated 15 structures a day, including routine line maintenance when required. This is a 300% increase in productivity.

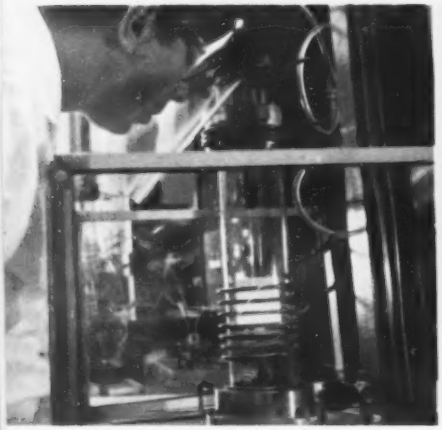
Since completion of the line, the Strato-Tower has been used for routine line maintenance, emergency midspan repairs, and for washing and greasing insulators.

Westinghouse has all these commercial atomic power facilities

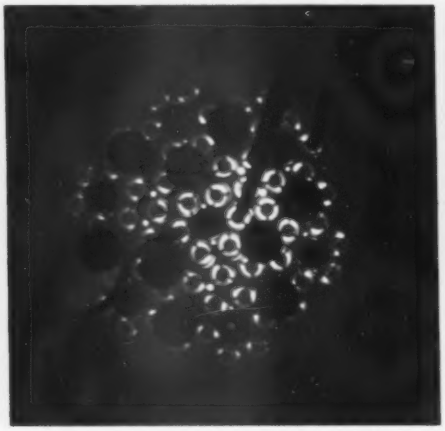
ATOMIC EQUIPMENT DEPARTMENT. Produces canned motor pumps, nuclear reactor valves and control rod mechanisms. Westinghouse pioneered these products.

COMPUTER CENTER. This IBM 7090 computer is the latest addition to one of world's largest computer centers for advanced scientific-commercial data processing.

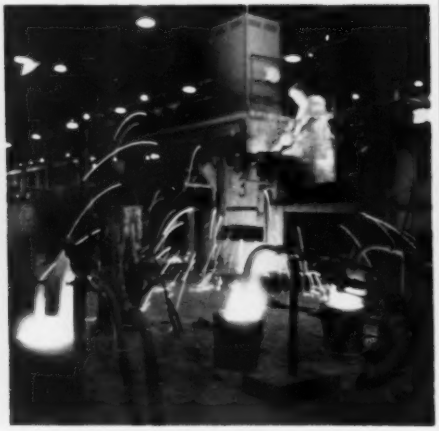
ATOMIC FUEL DEPARTMENT. Completely equipped, integrated fuel fabrication facility. Products include complete cores, fuel elements and control rods.



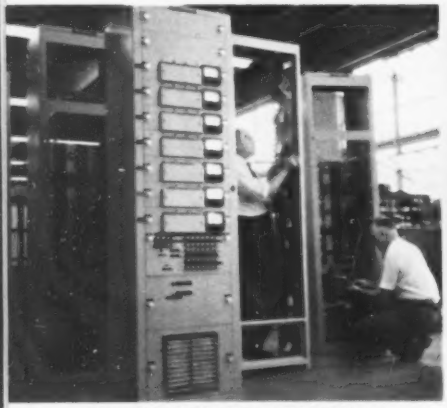
RESEARCH LABORATORIES. Westinghouse research has led to many important developments in nuclear science. Research is conducted by nuclear experts using advanced research facilities.



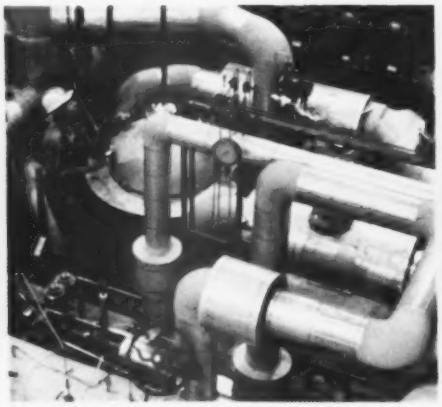
TESTING REACTOR. Most powerful privately-owned complete facility in United States. Nuclear fuels and other materials can be tested in reactor environment.



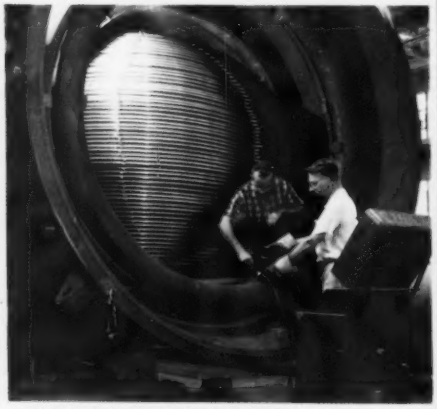
METALS RESEARCH FACILITY. Westinghouse provides complete pilot plant development work on metals, materials and equipment, under actual production conditions.



NUCLEAR CONTROL DEPARTMENT. Westinghouse control and instrumentation systems insure complete electrical compatibility in all phases of the nuclear power producing process.

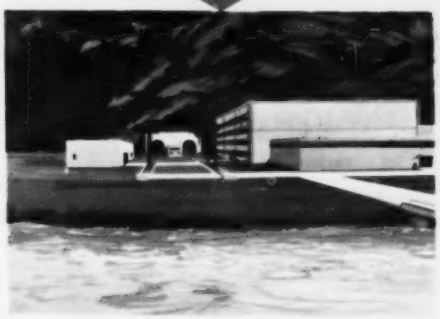


ATOMIC POWER DEPARTMENT. Here the work of thousands of Westinghouse employees is coordinated in the design and development of complete nuclear power plants.



HEAT TRANSFER DEPARTMENT. Advanced designs and fabrication techniques employed in Westinghouse heat transfer equipment are major factor in efficiency and performance of Westinghouse nuclear power units.

and has designed or is developing the reactors for all these atomic power plants

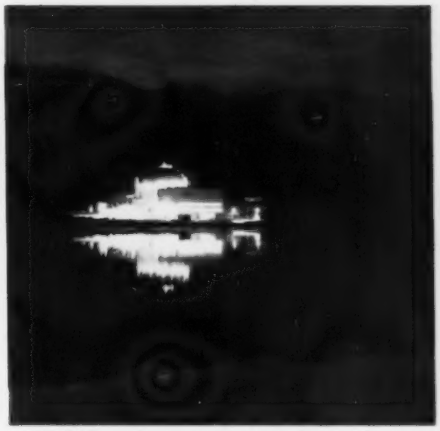


SENA, FRANCE. A 259-megawatt plant in Chooze, France, near the Belgian border (Artist's concept).

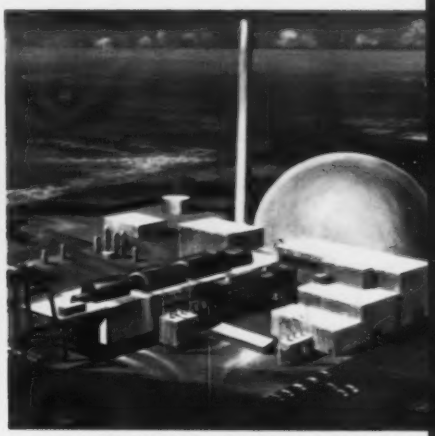
SAXTON, PA. An experimental water reactor to be used with an existing turbine-generator of the Pennsylvania Electric Company.

BR-3, MOL, BELGIUM. 11,500-kw plant for Centre d'Etude de L'Energie Nucleaire.

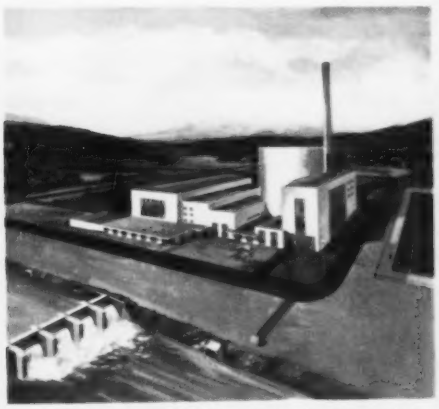
CAROLINAS-VIRGINIA. A 19,000-kw heavy water cooled and moderated pressure-tube prototype plant at Parr, S.C., for Carolinas-Virginia Nuclear Power Associates.



YANKEE. 150-megawatt plant for the Yankee Atomic Electric Co. at Rowe, Mass. New England's first atomic power plant is now producing electricity for the region's integrated power system.



SOUTHERN-CALIFORNIA-EDISON. 375-megawatt nuclear power plant proposed for Southern California (Artist's concept).



SELNI, ITALY. 186-megawatt advanced water reactor power plant for Societa Elettronucleare Italiana (Artist's concept).

SHIPPINGPORT, PA. Plant of Duquesne Light Co., the nation's first nuclear powered central station. Reactor designed by Westinghouse in cooperation with Naval Reactors Branch of the AEC.

JI-59505

Westinghouse

With a confident air of 'We know where we're going' NELPA delegates

LOOK FOR THE CHALLENGES

A group with some problems, some solutions, and a very optimistic outlook met recently in Portland for the annual NELPA convention.

One of the highlights of the convention was the "Utility Executives' Panel" which jumped in feet first to explore the convention's theme—"Look Now — Your Challenge is Showing."

Donald S. Bailey, vice president, Idaho Power Co., was first up with his consideration of "What About the Customer?" He cited the case of many old appliances, old publications and old services gone from the scene—dead for not pleasing the customer. The sad part about most of these stories, he said, was that we don't know we are lost until it is too late.

In order that this fate not overtake the electric utility industry he emphasized the importance of good service, the prompt adjustment of complaints and the training of all employees to be customer minded. His conviction was that our approach should be to personalize our service to the customer unless we, too, become "litter along the road to oblivion."

J. H. Clawson, president of Puget Sound Power & Light Co., reminded the group of the tremendous competition faced by the utilities in the Northwest with public power and flatly stated that they must find more economical ways of doing business. Most of the conference delegates were aware of the major role Puget Sound has played in developing methods of cost control. Much of this has been accomplished through mechanization of reduced crews, through making supplies more accessible, the establishment of work load standards, meter testing, the extension of property life, the reduction of records and fleet operations.

Clawson agreed with Bailey that we must have a customer-oriented viewpoint but that to stay in business we must also be competitive and that the validity of services offered must always be measured against their cost.

A. S. Cummins, vice chairman of the board of Pacific Power & Light Co., looked at the problem of the coordination of a large utility system. He asked himself the question, "Why a merger of two strong neighboring electric utilities?" First he said, "We may accept the fact that the historical pattern of growth in American industry is toward large-scale units. This does not mean that small business is doomed to extinction, but rather in the major segments of our economy that a larger proportion of goods and services is being produced by larger units.

"So has it occurred in the utility industry," he said. "The actual ways in which this was done and the reasons for it are essentially the same in whatever industry it has occurred —to realize the economies of large-scale production."

Kinsey Robinson, chairman of the board and chief executive officer of the Washington Water Power Co., said that with $3 billion per year additional capital needed for generation and transmission it would be well for all to keep the financial community aware of their programs. Robinson also felt that the investment picture was colored somewhat by the manner in which you get along with your local public utility commissions.

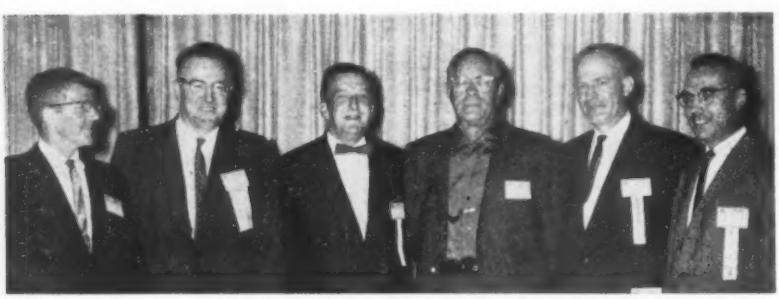
Finally, he said that their practice of going to commercial banks for interim loans so that they could issue obligations in larger blocks gave a better financial picture.

Olin H. Ririe, assistant to the president, Utah Power & Light Co., and NELPA's new president, spoke of employees—a company's most important asset. He said that regardless of what we may think, employees are still individuals and we need to get back to the specific concept wherein we recognize this truth. He said this would give employees of greater ability who will remain enthused and interested if we do a better job of keeping him *in* on things.

George W. O'Conner, vice president of the Montana Power Co., said it is becoming increasingly apparent that the concern expressed by some, several months ago, regarding the policy of the present administration toward business, and particularly our industry, was very modest. Evidence continues to pile up, he said, where executive and administrative personnel in the highest of offices are openly hostile to our line of business, developing problem after problem as time goes on.

J. N. Ford, general manager, Canadian Utilities Ltd., brought the group up to date on the "Economy of the Canadian Northwest." He pointed out the challenges and possibilities in the various provinces of western Canada. Speaking of the presence of oil, gas and coal as well as the mining and forest potentials in western Canada, Ford concluded that the Canadian Northwest holds almost unlimited promise if the people have the vision commensurate with the opportunities.

Frank M. Warren, president of Portland General Electric Co., and outgoing NELPA president, commented on the power supply in the Northwest. He said that the overall picture remains good with a surplus of power that should continue until at least 1965. He pointed out that roughly one million plus kilowatts would be made available by the recently completed coordination agreement. In conclusion War-



The work force: Fritz Cochrane, Idaho Power, Public Relations Section chairman; Hib Johnson, PGE, program chairman; Dave Roach, Westinghouse, general chairman; J. A. Riner, WWP, Purchasing and Stores Committee chairman; Ralph Radford, Utah P&L Engineering & Operation chairman, Darcie White, UP&L Business Development chairman

NELPA's Jeane Faulkner pins past president's pin on Frank Warren, PGE, as new President Olin Ririe, UP&L (at rostrum), and NELPA Vice President R. F. Plymire, Puget Power, look on. Right: Administrator Charles Luce, BPA (speaking), President Warren

ren said, "The questions of Canadian storage and the California intertie have been prominent in the news and, I am afraid, have given the impression that the Northwest faces an uncertain power future. This I feel is most unfortunate. Of course these problems are important, but the real Northwest story is one of aggressive and dynamic expansion of our power supplies at a pace which fully meets the challenge of population and industrial growth in this region."

After the comments of each of these utility leaders, the panel moderator, C. W. "Brodie" Leihy, publisher of ELECTRICAL WEST, opened the program to questions from the floor. Perhaps the most pointed question was to the effect, "Why do the people in the Pacific Northwest demand exclusive rights to the hydro power produced there when the tax dollars from California as well as any other state help to build these dams?" Leihy pre-empted the panel and suggested that the preference users in California had not been left standing empty handed when the federal dollars were being handed out for power development.

Earlier in the convention Charles F. Luce, administrator, Bonneville Power Administration, outlined many of the problems they are facing. He spoke of their disappointment at the turn-down of the Hanford reactor, which would have offered 800,000 additional kilowatts of firm power. He also spoke about the Canadian treaty and indicated that we in the United States have done everything we can toward ratification of the treaty. He said that no problem faced him greater than that to provide a concerted attack on the financial situation of the Bonneville Power Administration and that it would take a combination of measures to get the job done.

Major General Keith R. Barney told of the comprehensive development of the Columbia River, outlining the many projects already completed and those now in production. He said that one of the most recent events affecting Columbia Basin planning, and perhaps the one foremost in the news now, is the Columbia River treaty between the United States and Canada.

The NELPA members were as enthusiastic in their approval of the ideas expressed by Roger Wheaton in his talk "There's a Way To Do It Better—Find It" as were the RMEL members a few weeks before. Wheaton, president of Line Material Industries, helped point up some of the mutual challenges which he felt could be conquered through understanding of interrelated problems.

Charles H. Weaver, Westinghouse Electric Corp. vice president, said that atomic power generating stations can be economically competitive in New England and the Pacific regions of the United States; however, he warned that atomic power cannot be considered as an "off-the-shelf" item and emphasized the need for an orderly development program to continue the advance of nuclear technology.

Dean Bryner, staff engineer, Utah Power & Light Co., brought the latest word from Washington on the Upper Colorado transmission hassle. At the time Bryner spoke he thought the Senate subcommittee instructions to the Interior Department would force them to negotiate with the utilities. Subsequent developments have shown this may or may not be the case.

In concluding his talk, Bryner said, ". . . The Colorado controversy has shown us that we must do more than a good job of supplying our customers. We must bring our problems to each other to aid in continued improvements in services to our customers and also to improve our relations with our customers—the public in general — and the political bodies that govern us."

Echoing this feeling, Callison Marks, chief editorial writer of the Spokane *Spokesman-Review*, really challenged the assembly with his talk on "Power in the Press." He said, "The power industry of the Northwest is in the press—in the bite—in the squeeze — these days because of new and aggressive salesmanship of federal power by federal agencies.

"Individual power firms seem to be doing a good job in their relations with the public," he said, "but there is a big void in public knowledge of what the whole industry is doing and what it stands for — in regard to the major issues affecting resource development and conservation throughout the Pacific Northwest."

Marks went on to say that news of any kind faces heavy competition in the limited space available in the daily press and that it took more than publicity release handouts to gain the attention of today's news writers.

In conclusion, Marks said, "I believe you will find the press cooperative in transmitting to the public the facts and opinions that are current and newsworthy. But don't expect the press to fight your battles for you—especially if you are devoid of ideas, reluctant to speak up, unwilling to be quoted, or eager to put out only what most newspapermen would consider bald propaganda."

Section Chairman Darcie White, Utah P&L (center) goes over plans with Vice Chairman Leo Chaffin, PGE. NELPA Vice President R. F. Plymire, Puget Power, right

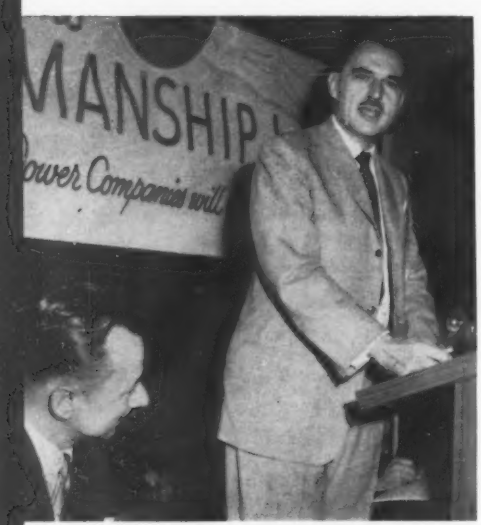
President George M. Brunzell of Washington Water Power, the host company, Spokane's Mayor Neal R. Fosseen and Miss Spokane, a WWP employee, welcomed the delegates to the sessions in the Davenport Hotel

NELPA'S reorganized Business Development Section is convinced that

The Future Demands Salesmanship

A revamped Business Development Section put its new program into motion at the Northwest Electric Light & Power Assn. conference in Spokane, Oct. 16-18. As in the past, the section met jointly with NELPA's Rate Research and Public Relations and Advertising committees.

Both general sessions and shirtsleeve discussions gave assurance that the group is taking seriously the conference theme, "The Future *Demands* Salesmanship," and will work to fulfill its promise that "the investor-owned power companies will lead the way."



Otto Zwanzig, Foster & Associates, Vancouver, tells about the BCE takeover. A. Claude Tindle, Hotpoint, Chicago (seated), was another general session speaker

As explained by Chairman Darcie White, the New Look in section organization and procedure was needed to supplement the "sit down" type of conference and to realize the potential in committee studies by putting them on a regular basis.

Accordingly the section has been organized as a functional body, with a year-round program to set up machinery to help solve industry problems. Twelve standing and special committees will study new tools and methods and develop selling ideas. They will report to bureau chairmen or to the section vice chairman.

Among the advantages of the new system is the opportunity for greater participation of members, particularly of manufacturers, distributors, agents and contractors.. Now some 78 people, including 10 Class B members, are directly involved in the all-year activity, as compared with half a dozen or so in the past, White reported.

Present thinking, he said, is that a chairman will retain direction of his committee until circumstances dictate a change. He emphasized that the plan is still flexible, adding that he would be disappointed if changes were not made, particularly in adding participants.

Speakers at the general sessions gave the ammunition for the year ahead. In a greeting that was also a forthright call to "load your guns," President George Brunzell of Washington Water Power Co. reminded the sales and public relations people that they are the first line of defense against a small but determined group who want to socialize electric power and eventually all industry. "You are our eyes and ears that we must depend on to report public attitudes back to us. You also are our best opportunity to keep our customers informed of issues affecting the utility industry."

Two strong programs are needed, Brunzell believes, one to sell electric power at a reasonable profit and the other to tell the American way of life. Pointing out that there are signs that people are beginning to realize that there is no such thing as a free lunch, he declared, "We must make sure that they are aware of our problem. No one will do it for us."

Responding to the greetings of the hosts, NELPA Vice President R. F. Plymire also helped to set the stage when he counseled the salesmen to "make competition, not be satisfied with meeting it."

"You don't sell things unless people like you," said John Lashley, vice president of Seattle's Pacific Na-

tional Bank, who believes employees are the key to all sound public relations programs. Industry is overlooking the proper training of personnel on how to meet and treat the public, he pointed out. He believes the place to start is with management, who should understand that there are human as well as financial resources.

Deploring the lack of professional salesmen, Hotpoint's A. Claude Tindle recommended a Certified Professional Salesman's program, to be known as CPS, to give salesmen the training and recognition enjoyed by accountants under CPA and insurance underwriters under CLU. The CPS would have a working definition and a set of standards and would be given after requirements were fulfilled. A second certificate could be awarded in a special field.

Putting together suggestions taken from wide reading on salesmanship and his own ideas, Tindle recommended that the industry give a chair to some university for the purpose of setting up a major in selling; that an American College of Certified Professional Salesmen be established; that a CPS register, both national and state, be set up and administered by CPS associations and financed through a surcharge to dealers and salesmen, permitting salesmen to qualify for jobs all over the country and opening the field to employers.

Significance of the B. C. Electric takeover for marketing men was pointed up by Otto E. Zwanzig, Foster & Associates, Vancouver, and former general sales manager for BCE. He also believes that salespeople are in the best position to assess public reactions, either formally through surveys or informally through "that sixth sense of intuition which every competent marketing man possesses."

The quiet acquiescence and acceptance of the BCE confiscation by the business community is something that might be pondered, he said. However a shift in public opinion is gradually being noted. Major newspapers in Vancouver and Victoria now have become critical of the Premier's action in the BCE takeover. Reports of negative reactions in foreign investment circles, news stories and editorials of a kind that should have appeared years ago are now an almost daily occurrence in the press, he said.

"You too have an excellent story to tell. Don't be afraid to approach your local communication media to tell it for you—they may be potentially stronger allies than you believed. Do it while there is time, don't wait to press the panic button when a crisis is upon you, for by then it may be too late," he urged.

Underground distribution as a sales tool was considered by R. F. Plymire, vice president of Puget Power, and Leo Chaffin, assistant general sales manager, PGE, at Tuesday's joint committee session. Both companies have made considerable study of feasibility and economics of such systems.

Plymire showed slides of some of the installations made at new developments in his area and concluded that underground service is a powerful sales tool for both Puget and the developer when total electric contractual arrangements can be consummated and presently is also a fine sales tool for the developer irrespective of the type of electric service provided.

With 3,000 living units connected and in service underground, Portland General Electric has had plenty of problems, according to Chaffin. Proper location and screening of service entrance poles, transformer locations, handling temporary service, coordination with other utilities are a few of the things that must be considered, he said. Underground is good for the community and good for the company, he declared, but it must pay its own way.

James Mowrey, PP&L, Medford, chairman of the Electric Home and Farm Bureau, and Al Couch, Puget Power, Bellevue commercial and industrial chairman, were in charge of the group discussion meetings

The Rate Research committee sessions were led by Ben Gadeholt, PP&L, right, committee chairman. He talks here with Jack Heidt, Montana Power, next year's chairman, and Hilton Brown, right, Puget Power, vice chairman for the coming year. Rate and Public Relations men joined the sales group for general sessions

Fritz Cochrane, Idaho Power, chairman of the public relations and advertising committee, reads a biased account of electric power in a school text book, while H. U. Wright, WWP, arrangements chairman, looks over his shoulder. Henry Harper, Southern California Edison, left, told of his company's program to combat such bias

If it's electrical cable, pure as the driven snow isn't pure enough. Take the oil saturant for paper cable, for example. Even tiny impurities, one part in 10,000, will affect the performance of the cable. Our Research and Development Department uses an infrared spectrophotometer to establish standards for each type of saturating oil. These standards, using both qualitative and quantitative spectroanalysis, are so high that they are beyond the limits of normal organic analysis. Using spectroanalysis graphs, like the one below, our research department can determine the composition and the molecular structure of organic materials in their original state. Changes in the structure and composition after actual or accelerated service tests can also be detected. Only the oil saturants

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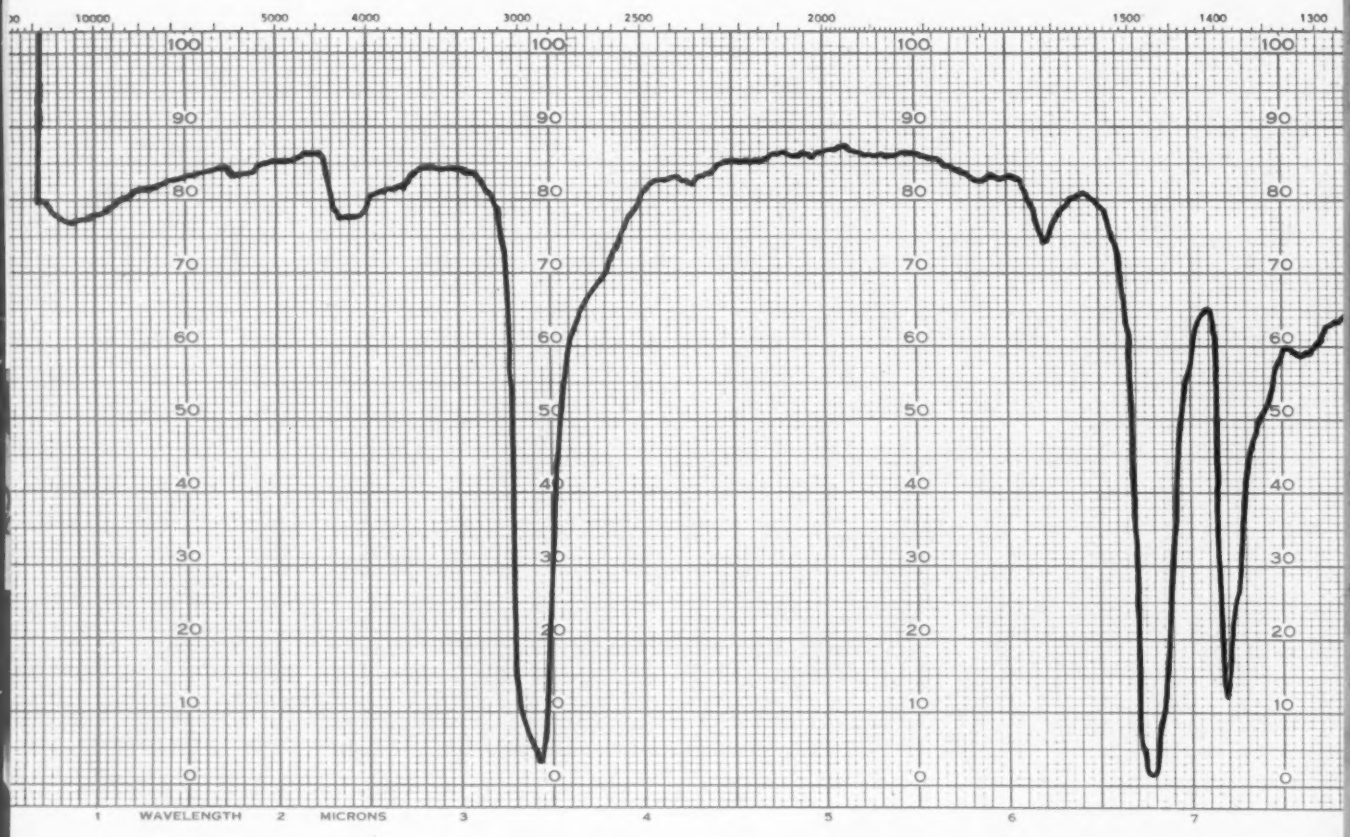

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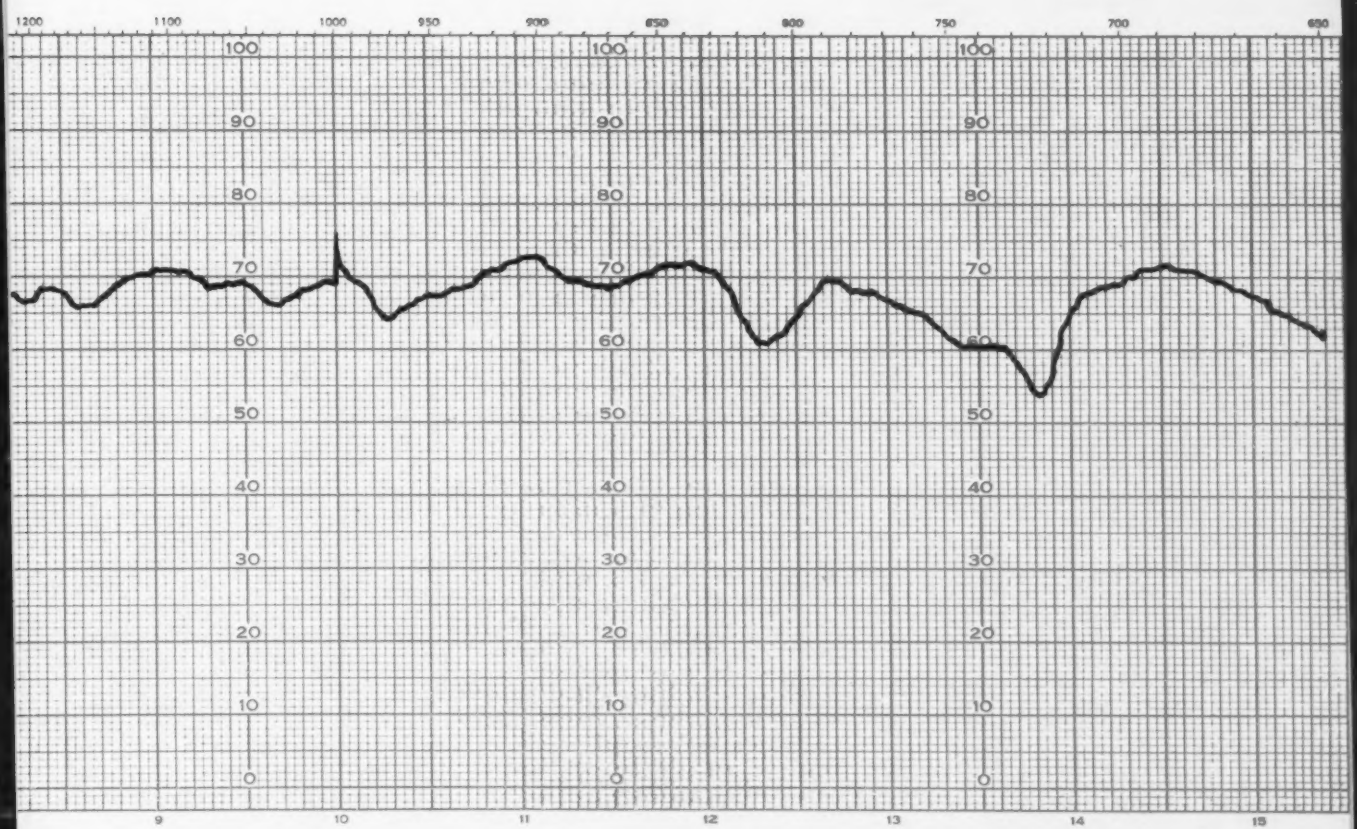


Upper left: Leo Chaffin, PGE, next year's section chairman, enjoys a joke with W. W. Talbott, Montana Power, vice chairman. Above: Ken Kraft, Puget Power, showed his company's new color film to the joint group. Left: Robert Wilkinson, manager, Inland Empire Section, NECA, and W. S. Fisher, applications engineer, G-E, Nela Park, speakers at the final session

A program to tell the story of private power development in the schools was described at a luncheon meeting by Henry Harper, manager of public information for Southern California Edison Co. Textbooks tend to have a government power oriented bias, he said, and read from one to prove his point.

Edison is using a kit put out by Amidon & Associates, which presents a factual account that cannot give offense. It contains no advertising except the company name on the booklet cover and on the charts. The kit is put into the teacher's hand after consultation with school authorities and has had good acceptance as educational material.

He brought out in his luncheon talk and later in the Public Relations and Advertising meeting that in any such program used in the schools restraint is a must. Whatever the means of telling the story, the material must be educational and factual, he pointed out. If it stubs its toes at the school gates, no matter what the reason, the time and money might as well have been saved, he warned.

"Power to Live By," a colored film on Puget Power's Mt. Baker development, was shown Wednesday morning. Ken Kraft, advertising supervisor, told how the utility broadened the scope of the movie, adding footage on taxes, area development and importance of the company and its people to the community. The picture effectively builds its story around the dam, showing that Puget is serving its customers best through private enterprise and is proud of it.

Consideration of all the things that go into the best use of space in modern life (rather than individually as lighting, heating, acoustics and air conditioning) is being brought about by necessity. Will S. Fisher, applications engineer, General Electric Co., Nela Park, Cleveland, ending a tour of California IES meetings, brought awareness to the Wednesday morning session of the possibilities now for "electric space conditioning."

The increase in lighting levels necessitating more equipment giving off heat, the economic pressure in building to make every square foot more usable, the increased use of office machines, the greater density of people giving off heat, the large expanses of glass admitting solar energy, all call for a better integration of the cooling and heating with the lighting of an environment for any kind of work.

Fisher showed illustrations of examples of this type as well as charts to determine the design criteria necessary. He illustrated construction features of lighting equipment designed to remove heat and ended with the methods that may be employed to take unneeded heat from where it is given off to places requiring it, and developing the highest economies.

Likening the electrical industry to an electric drill, Robert Wilkinson, manager, Inland Empire Chapter, National Electrical Contractors Assn., compared the utilities to the motor, the manufacturers and distributors to the gear train and chuck, and the electrical contractor or dealer to the drill itself. If the drill is dull or if the assembly is pointed incorrectly the entire operation is inefficient, he said.

What the NECA through its training programs, and particularly its new National Sales Institute, is endeavoring to do to sharpen the book end of the industry for "the greatest sales power" was described by Wilkinson. The contractor, even inefficient, is responsible for a volume of business equivalent to that of the utilities and the manufacturers and distributors, he said. The big thing NECA is trying to do is to make them strong enough to improve their selling and not have it depend on price alone.

He gave a sample recording of the first institute held in Washington recently (two contractors from Spokane attended). He asked for leadership from the power companies as well as recognition of those contractors who have the right attitude toward selling and business. He asked that the utilities not destroy the contractor's position with the customer by increasing price consciousness. All of the NECA chapters, he declared, were anxious to work with the utilities in further development of their markets.

Are you really preparing for the years ahead? asked W. W. Bruns, director of area and economic development for Pacific Northwest Bell at Seattle, who advised keeping one rosy eye cocked. There will be a big demand for planning, judgment and imagination to make those rosy predictions come true, he warned.

Milton Kapp, chairman of PIP Committee and president of Interstate Power Co., was another of the speakers who called on the industry to change its ways. We need a new frontier ourselves, he said, in his luncheon talk: "People don't understand us." The difference between government and investor owned power is in service and citizenship, he stated. He believes it is important that we become better citizens, that we tell our story well, and say thank you when we get support. He called for participation in all the industry's national organizations, stating "we must stop winning battles at home and losing them in Washington".

(Continued on page 98)

San Francisco hosts

NATIONAL POWER CONFERENCE

The National Power Conference —one of the year's most profitable joint ventures of AIEE and ASME— rallied the nation's leading lights in the fields of power generation and energy transportation at the St. Francis Hotel in San Francisco.

A meeting of specialists and for specialists, the meeting's two dozen papers were carefully screened. All worth-while. It was a refreshing departure from the paper-heavy meetings with numerous parallel sessions creating a plethora of mediocrity. At the National Power Conference there was no feeling that giving a paper was the price of admission. Thank goodness!

W. H. Byrne, president of ASME, appealed to the group to consider the possibilities of joint research propects. The end result would be to achieve more total research for the same amount of dollars. Byrne indicated that he was not looking for a dictatorial approach to industry research, but just expansion of the benefits of the joint approach.

At power conference: W. H. Chase, president of AIEE; G. W. Abbott, former Assistant Secretary of the Interior and now a Nevada lawyer; ASME President W. H. Bryne

Nuclear Plants

James Coughlin of Babcock & Wilcox discussed his company's spectral shift control reactor. He pointed out that design is completed for a 415-mwe nuclear plant offering electrical energy at 5.5 to 7 mills per kwh depending upon the company's accounting system.

R. W. Dickinson, R. C. Gerber and C. L. Larson, all of Atomics International, discussed the Hallam nuclear power facility. The Hallam facility, completed in July of this year, is currently undergoing a year of pre-operational testing. One of the most desirable aspects of the plant is that it produces steam thermo dynamically comparable to that used in modern steam plants.

John Barnard of the General Electric Co. described the Vallecitos experimental superheat reactor, which will go critical in the fall of 1962, becoming the world's first separate superheat reactor.

General Atomic's Titus LeClair traced the development of gas cooled reactors to date and then gave a progress report on the high temperature gas cooled reactors that are under construction and in the design stages. Most advanced in this area is the ESADA program, which has as its goal the design of a 300-to-500-mwe-capacity plant capable of producing competitive power.

Combustion Engineering Inc's R. H. Wolin discussed the subject of low head boilers. The reduction in high pressure steam piping and structural components contributed to a 20% saving in erection manhours over an equivalent conventional "high" design for units at Southern California Edison's Los Alamitos and Etiwanda stations.

Philadelphia Electric Co.'s J. H. Harlow reported on one year's operating experience with the 325-mw Eddystone unit which operated at the frontier conditions of 5,000 psi and 1,150 F.

Turbine Generators and Auxiliaries

According to John R. Hamann and D. C. Parker, both of the Detroit Edison Co., the starting requirements for a 100-mw unit on their system have increased from 23 starts in 1952 to 256 in 1960. This condition lead the authors to develop a starting technique for reducing thermal shocks to turbine metal during start up and initial loading.

A paper by M. R. Lory and C. L. Wagner, both of Westinghouse, covered the subject of transient thermal problems of large generators. In the paper the authors have defined the negative sequence capability of a machine in terms of the parameters which affect the duty to which it is subjected and have limited the ceiling excitation time to one-fourth minute. It is hoped that this is a middle road that will be acceptable both to equipment operators and equipment builders.

The economic factors affecting integration of sea water distillation and steam power generation cycles were discussed by E. H. Miller of General Electric. He indicated that integration of power and water generation facilities substantially reduced the fuel cost component of producing fresh water from brackish or sea water.

J. J. Heagerty, also of General Electric, discussed the factors affecting the selection of drives for power station auxiliaries. In this area he touched on both boiler feed and fan drives.

Application of Computers

Two papers on the subject of computer applications for processing data on turbine generators were presented. The first covered the processing of turbine-generator acceptance test data, and was presented by G. A. Maneatis and W. H. Barr, both of Pacific Gas and Electric Co. The paper concluded that a computer program drastically reduced the time and effort required to process the test data, that, additionally, the ability to rapidly finish computations enabled the group to detect and correct errors in the setup of test instrumentation, and also to use the computer to evaluate instrumentation used for routine testing.

The second paper covered the application of computers for in-process performance testing for the purpose of performance monitoring. This paper was presented by a trio of authors from General Electric, K. C. Cotton, J. C. Westcott and T. J. Glass. The authors point out that, aside from protection of malfunctioning components, the heat rate calculated by the computer can become an input for automatic dispatch systems.

Treating a subject of growing importance to the West, W. E. Hopkins, Stone & Webster Engineering Corp., spoke on transportation of electrical energy versus transportation of fuel. He concluded that, where a high capacity factor operation was possible, EHV transmission has an excellent chance of competing favorably against other methods of energy transportation.

Automation

A paper by R. D. Hottenstine and R. Egglestone of Combustion Engineering Inc. looked at the philosophy of power station automation. It pointed out how today's automatic plant attempts to tie together a series of subsystems rather than approach automation on the basis of a complete plant control system. The equipment necessary to communicate between the separate control loops adds greatly to the cost of the overall system without improving performance.

J. F. Cotter and F. C. Lisevick, also of Combustion Engineering, presented a paper entitled "Improved Measuring Techniques for Steam Generator Heat Absorption Test." The authors point out the need for accurately checking the performance of today's higher capacity boilers against design criteria which have been extrapolated from test data taken from smaller and older designs.

Bailey Meter Co.'s H. H. Gorrie made a comparison of general purpose and special purpose computer applications highlighting their pros and cons. Looking ahead to the completely unattended plant, he views close cooperation and teamwork between the manufacturer and the user as essential to achieve the economic end.

A report for the subcommittee on application of probability methods, prepared by H. A. Adler of General Public Utilities Corp. and E. S. Loane, Commonwealth Edison Co., described a method of collection data that could be used in a variety of circumstances to predict possible outages based on historical unit or component failures.

A. P. Hayward of the Duquesne Light Co. presented a paper on economic scheduling of generation by valve points. He pointed out that valve point loading has been the basis of the economic loading of Duquesne Light Co. since 1932.

A trio of authors, H. G. Dallas, Philadelphia Electric Co., D. Horwitz and R. L. Osborner, both of Westinghouse, reported on instrumentation necessary for dynamic response testing of the Philadelphia Electric Co.'s Cromby No. 2 steam power plant. The results of the dynamic testing were used to test a mathematical model of the power station.

High Temperature Steam

A quartet of papers on the characteristics of high temperature steam and the materials associated with these temperatures seem to indicate that the industry's researchers were finding techniques to cope with still higher temperatures and pressures. The papers' subjects are as follows: "Metallurgical Evaluation of Superheat Tube Alloys after 12 and 18 Months Exposure to Steam at 1,200, 1,350 and 1,500 F," by C. L. Clark, Timken Roller Bearing Co., J. J. B. Rutherford, Babcock & Wilcox, A. B. Wilder, U. S. Steel Corp., and M. A. Cordovi, International Nickel Co.; "Scale Formation on Austenitic and Ferritic Materials Exposed to High Temperature Steam," by F. Eberle and C. H. Anderson, Babcock & Wilcox; "Evaluation of Weldments Joining Superheater Tube Alloys After Exposure to Steam at Temperatures of 1,100-1,500 F," by William E. Clautice, U. S. Naval Engineering Experiment Station; and "The Effect of Corrosion by Steam at 1,100-1,500 F Upon the Heat Transfer Through Superheater Tube Alloys," by H. L. Solberg, J. E. Brock and W. J. Rebello, Purdue University.

CONFERENCE PLANNERS—Meeting in Chicago on Oct. 4, officers and executive committee of the Public Utility Buyers' group, National Association of Purchasing Agents, discussed program details for their 31st annual midwinter conference, to be held in San Francisco, Feb. 4-6. Frank E. Baxter, Pacific Gas and Electric Co., is chairman of the group; W. C. Allen, Utah Power & Light Co., is secretary-treasurer; Ray Benton, PG and E, chairman of the arrangements committee for the 1962 conference. Pictured left to right: (standing) Delano J. Fitzgerald, Wilton L. Brown, J. Donald Hogg of the advisory committee, John I. Evans, J. P. Blumer, D. E. Nesbit, Walter Y. Cottom; Stewart S. Stevens, Louis R. Tomey, Raymond V. Spangler, L. Glen Wiseley, advisory committee; Stephen J. Kennedy, Ray Benton; (seated) Louis H. Moss, Marshall Pease, Alec C. Little, J. R. Carmichael, advisory committee; W. C. Allen, secretary-treasurer; Basil L. Nelson, vice chairman; John M. Warner, first vice chairman; Chairman Baxter

CONTRACTING & CONSTRUCTION SECTION

STATISTICS / COSTS / PROPOSED PROJECTS / NEW PRODUCTS / NEWS

LATE NEWS FLASHES

Pad-Mounting Rules in Oregon

Increased use of underground distribution in Oregon, employing direct burial cable and pad-mounted transformers, has brought from the Oregon state inspector some rules for their installation where oil-filled transformers are employed. Minimum distances from combustible and noncombustible structures, grounding, protection of oil cooling tubes, primary protection and other factors are spelled out specifically in the newly approved standard.

Breakup over Breakers

A special committee of manufacturers and inspectors brought together in Chicago last month to seek a satisfactory solution to the noninterchangeable circuit breaker problem got nowhere. The manufacturers sought more time by suggesting fact-finding studies, referral to other panels and other means. The inspectors went home disappointed. Steps to outlaw wafer-thin-type breakers are being taken in several cities. They are the newest complication to this already complex controversy.

National 6% Plan Deferred

Although discussed, the 6% national wage assessment under consideration by NECA to finance a nation-wide welfare program for IBEW was not brought to a decision at the national convention in Washington, D. C., in mid-October. Although many object, few contractors made articulate protest except District 6 of the Pacific Northwest.

► **Kendrick L. Scofield** has been appointed treasurer of Pacific Electric Motor Co. of Oakland and Pittsburg, Calif., William Boyd, president of the company, announced.

Page 87 NEW PRODUCTS
94 WESTERN BUSINESS TRENDS
93 READER SERVICE SECTION

President Art Vesco and President-elect Charles Pierce, code workshop chairman, Southwestern Section, settle some details

At left, Frank Stetka, NFPA field engineer, clears a code intent at SW industrial workshop reviewing proposed code change

INSPECTORS TACKLE NEXT CODE

Actions and attitudes significant to all branches of the electrical industry usually come out of the annual meetings of both the Northwestern and Southwestern Sections, International Association of Electrical Inspectors. Although this year's meetings were dedicated to the last review possible of proposed changes for the 1962 edition of the National Electrical Code, such a review brought forth what inspectors felt were their major headaches.

The noninterchangeable circuit breaker broke out in new multiple form at both meetings and at the Southwestern Section a separate session on ground return arose above the maze of detailed editorial changes and additions to the industry's code.

Boise was the scene of the 35th annual section meeting of the Northwestern Section Sept. 10-13 at Hotel Owyhee, attended by more than 150 members of the industry. Park H. Forte, Boise chief inspector, was general chairman. E. M. Tubbs, Bellingham chief inspector, was president of the section and W. L. Gaffney, Tacoma, its secretary-treasurer.

A last-minute move from Coronado to Long Beach may have cut down the attendance to the Southwestern Section's 38th annual meeting to 250 at the Lafayette Hotel. Arthur Vesco, San Diego's chief inspector, was section president and L. E. La Fehr, Alhambra, general chairman and program arranger as well as section secretary-treasurer. Host was Charles D. Metzger, Long Beach chief electrical inspector.

International President G. C. Monroe of Springfield, Mo., and E. F. Cogan, secretary-treasurer from Chicago, Frank Stetka, field engineer, NFPA, and IAEI code consultant, as well as Leslie Price of NEMA, addressed both of these conferences. Karl S. Geiges, Underwriters' Laboratories vice president, Santa Clara, was an additional speaker at Boise, as Kent Stiner, I-T-E BullDog, Detroit, was at Long Beach.

President Monroe ended his review of the IAEI's financial and internal affairs and growth with recommendations for the employment of a managing director for the international office in addition to the international secretary. Since a financial reorganization during the past few years he felt that the time had come to share the tremendous work load at headquarters. Several candidates are being considered for the important post. He, likewise, spoke frankly of a public relations problem with the manufacturers and other segments of the electrical industry. He urged a new attitude toward manufacturers of electrical equipment that would make them feel really wanted at IAEI meetings, not being permitted by sufferance, an impression some have gained during recent years.

In his visits to the various chapters of the Southwestern Section, Arthur Vesco, president, noted the lack of communication between chapters that was leading to varieties of interpretation of what should be the standardized electrical code for the country. He called attention to the growing complexity within the industry because of new materials, new methods of installation and higher costs for an electrical job. The making of more compact equipment could not be judged on old inspection methods when reliance on bulk "perhaps had given us a false feeling of assurance." With California's new state housing law, which adopts the NECode, he said inspectors were in more serious need for standardizing code interpretations to avoid getting into unpleasant situations with the State Division of Housing.

But the chief business of both meetings was to take a final look at the proposed changes to the National Electrical Code and voice their approval or objections before the Dec. 1 deadline date. "Like their pioneer forefathers who settled this great country, these modern pioneers trekked through the 380 pages of the proposed amendments, heading for the promised land of good code legislation," as our reporter for the Northwestern Section, James Backenstos of Portland, Oregon Chapter president, aptly phrased it.

Frank Stetka, field engineer, NFPA, had brought a quantity of the preprint with him. He admitted that this left too short a time for perusal and study of it before consideration at these meetings. Yet, he said, only 500 orders had been received from the entire country before printing whereas five or six times as many were needed.

The preprint listed the proposals recommended, those rejected and the reasons for rejection, those remaining on the docket and those referred to other code-making panels. Stetka also reported that several important committees were working hard to meet the deadline, including the machine tool committee, that on electronic computer systems, one on mobile homes and trailers, another on swimming pool lighting, hospital emergency electric systems and technical subcommittees on overcurrent protection associated with high-current capacity networks and of installation of electric heat cable for deicing.

Inspectors are not satisfied that the noninterchangeable breaker problem has been solved as yet. In both of the meetings the subject flared up in different code discussions. The recent introduction of very thin circuit breakers, which will permit two where only one would go before, has aggravated the problem. Inspectors were numerous who claimed that the maximum 42-circuit panel could be banked up to 60 or more circuits. This brought demands upon the manufacturers to make such a thing impossible.

One manufacturers' representative at both meetings struck back with a request that inspectors cease demanding the impossible. No device or equipment can be made, he claimed, that cannot be tampered with and altered by some mechanic determined to do so. The entire burden of enforcement cannot be passed on to the manufacturer, he maintained.

In general, the Northwestern Section went along with the preprint proposals with the exception of the rejected one from its own J. F. Gray, chief electrical inspector of Portland, requiring separate identification of neutrals when conductors of different systems are installed in the same raceway. If Gray's proposal that a red conductor be used to designate the high leg on a delta system where the neutral is present is unacceptable, they maintain, then some other color coding should be worked out. With the increased use of systems of various voltages in the same premises the need for more positive identification is important. Inspectors claimed that connections to wrong neutrals can make a circuit conductor out of grounding conductors and water piping as well as other metals throughout the building.

Southwestern Section's method of handling the code discussion is to conduct code workshops in three categories: residential, commercial and industrial. The actions taken at each workshop are then reviewed and either approved or disapproved at the final day's session. Charles R. Pierce, Fresno chief inspector, was general code chairman, with Paul Davison as chairman of the residential shop, Delbert H. Hansen commercial, and A. W. Pollock the industrial shop. Underwriters' Laboratories volunteered its Henry J. Chateau, Charles T. Brooke and O. G. Wedekind to act as secretaries for the code workshops.

Important actions taken pretty much coincided with those of the Northwestern Section as respecting the 42-circuit limitation on panels (differing in that the manufacturer would have to design the panel so that more could not be added), the identification of grounding terminals in receptacles and in attachment caps. The Southwestern Section industrial code shop submitted a proposal for a new article entitled "Workspace and Guarding," which follows pretty much the provisions of the California State Safety Orders. It deals with the safety aspects of space around equipment in which to work. Request was also made for approval of liquid-type flexible metallic conduit in sizes up to 3 in.

With so many members of the electrical correlating committee present at the Southwestern Section, opportunity was taken by L. S. Inskip, Bell Telephone Laboratories, chairman of panel 5, to hold a special meeting Tuesday evening to discuss the grounding proposals that had been made by the Southwestern Section a year earlier. With Inskip on a panel was Baron Whittaker, chairman of the correlating committee, Underwriters' Laboratories, and R. L. Lloyd, National Bureau of Standards, chairman of Article 240 and a member of Article 250 panel. Invitations had been sent to utility companies and a large group attended from telephone, water, municipal and private utility engineering staffs.

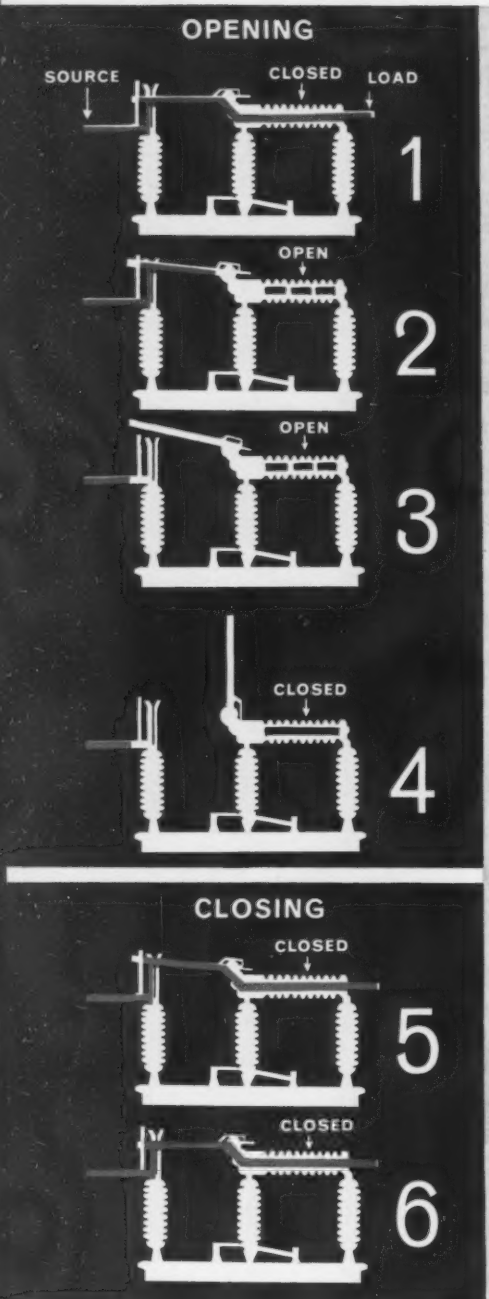
The electric utility engineers protested that the proposal, because of the inadequacy of earth grounds and the objections by the water utilities to the use of the water piping system for ground path return, would require the utility to provide the return fault current path through the neutral with a conductor of sufficient size to carry it. The utilities objected that in many instances they furnish three-phase, three-wire service on a four-wire system and customarily meter with a three-phase, three-wire meter. Hence, requirement for metering on a fourth wire also would cause increased costs or risk current theft.

The utility representatives heatedly maintained that the proposal and the situation causing its submittal should be given much more

IAEI President George Monroe with W. R. Volheye, retired Oregon State inspector, a former IAEI president and code member

Industry leaders, these three—George Monroe, IAEI president, Springfield, Mo.; Sam Rosch, famed chemical research man of Anaconda, now retired; Charles Price, NEMA's manager of safety regulations. Behind them is Lou La Fehr, SW secretary

Works like a circuit breaker—looks like an interrupter switch



This is Circuit-Switcher. Costs less than a circuit breaker. Outperforms an interrupter switch.

Circuit-Switcher is the generic name for a new family of switchgear for handling a number of circuit interrupting duties on transmission systems. It's a cross between an interrupter switch and a circuit breaker. A significant feature of Circuit-Switcher is that it is mechanically programmed to fit high-voltage switching environments, whether breaking or making the circuit.

PROGRAMMED CIRCUIT BREAKING

1. When Circuit-Switcher is in the closed position, the interrupting section carries the continuous current and withstands short-time surges—like a breaker.
2. As Circuit-Switcher starts to open, the "brain" mechanism (with its built-in sequence control and stored energy) trips the interrupting section, opening the circuit—like a breaker.
3. Now the "brain" moves the disconnect blade toward the open position to establish a visible air gap—like an interrupter switch. But unlike an interrupter switch, the blade is not burdened with shunting, actuating, and driving an interrupting unit.
4. As the disconnect blade approaches the fully open position, the "brain" recloses and recocks the interrupting section, unlike the interrupter switch which must recock at the most adverse loading point in its closing cycle.

PROGRAMMED CIRCUIT MAKING

5. As "brain" closes the blade, inrush current (or fault current) is picked up at the jaw . . . not in interrupting section. Unlike the interrupter switch, the blade closes at high speed, unimpeded by having to reclose and recock an interrupting unit.
6. Circuit-Switcher is completely closed—ready for the next opening cycle.

With the guts to do the job

Like a circuit breaker, Circuit-Switcher's vital close and trip mechanisms are fully enclosed and protected. Unlike an interrupter switch, there is no gingerbread—no external shunts, triggers, cams, and levers—to freeze up, burn up, jam up, or goof up.

Operation is "Goof-Proof"

The correlation of interrupting section action, disconnect blade action, and operating handle action is pre-scheduled by the "brain" mechanism. Any operating procedure—such as reversing direction in "midstream"—will not result in improper sequencing of interrupting section and disconnect blade.

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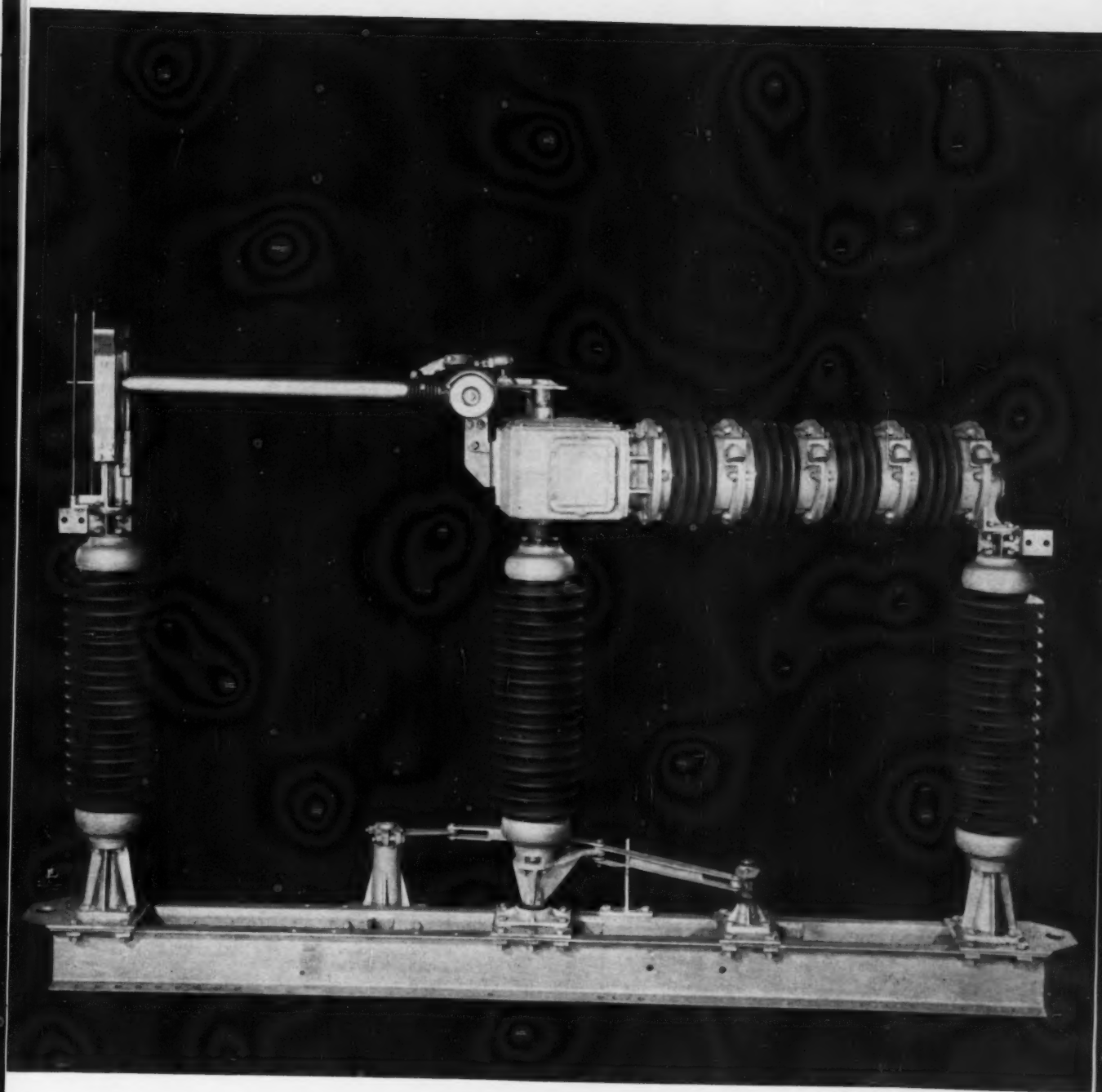

field study. Eustace Soares, who had submitted two similar proposals, for code changes, maintained that a satisfactory ground return that will clear on a fault cannot be obtained with anything but a neutral return circuit. This problem is made acute in the Southwestern Section area because of the prevalent desert areas with very dry ground conditions and the recent introduction of plastic water mains as well as objections of water utilities to use of their underground piping systems for a fault return.

Karl S. Geiges, vice president, Underwriters' Laboratories in Santa Clara, reviewed at Boise some of the field problems that have been encountered on the West Coast. In both TVA and Western areas where electric heating is done some types of wall insert heaters having copper reflectors have given trouble due to oxidation of the copper which makes them heat transfer mediums instead of reflectors. A change in construction and use of aluminum reflectors has alleviated the problem.

He also touched on panelboard failures due to loose main connections, labeling service on trailers and mobile homes and a need for both 50-amp and 30-amp supply to trailers where many appliances are used. Difficulties with three-wire receptacles of the split-bus type have caused California cities to refuse their use because of the danger of getting 240 v instead of 115 from misapplication. Also touched on were lighting fixtures for use on low-density cellulose ceilings, mismatched caps and receptacles, testing of foreign made goods, swimming pool lighting and baseboard heating.

The solution to swimming pool lighting, he said, seems to point toward low-voltage pool lighting systems with a transformer fuse to protect against the higher currents involved. An unexpected hazard has been found with baseboard heaters in Oregon and California where rugs are placed under heaters in wall-to-wall carpeting. Drapery falling against the heaters has resulted in fires and the laboratories have changed their standards to limit the amount of the opening under the baseboard heaters and to require thermostatic control.

Special session on grounding with Baron Whitaker, chairman of the Electrical Correlating Committee; L. S. Inskip, Bell Telephone Laboratories, Panel 5 chairman; and R. L. Lloyd, U. S. Bureau of Standards, Panel 4 chairman, as a panel to hear local views

A voice raised in support of the Underwriters' Laboratories at both meetings was that of Leslie D. Price, manager, engineering and safety regulations, NEMA, New York. He spoke of the unique nature of Underwriters' Laboratories, a private nonprofit organization, not a government agency, respected by all branches of the industry and the public. He contrasted this with Europeans' methods where codes are government edicts. "I believe it is self-evident that the basic rights of a state, a county or a municipality to promulgate safety requirements for its people would be abridged to a considerable extent if the European pattern of centralized regulation of safety requirements was attempted here on a nation-wide basis under federal government direction," he declared.

Comparison of the short circuit protection provided by the instantaneous magnetic trip circuit breakers as compared to the thermal magnetic for protection of motor branch circuits was made by Kent P. Stiner, I-T-E, BullDog Division, Detroit, at the Southwestern meeting. After analysis of the various factors in motor operation and protection he showed that, while both circuit breakers and fuses provide short circuit protection for motor circuits, the ETI breakers set at 11 times motor full load current open in one cycle while the other means require longer intervals and thus offer more assurance of less damage to circuit components. The instantaneous trip breakers are not affected by ambient temperature or fluctuating loads or number of times the motor is started, he concluded.

At its election, the Northwestern Section moved Eldon L. Shirley up from first vice president to president to succeed Edward M. Tubbs; Loren Christensen, Salt Lake City, became first vice president; Mark Lundy, Idaho State, second vice president; and W. L. Gaffney was re-elected secretary-treasurer. Executive committee has on it R. M. Countryman, James S. Backenstos, J. D. Gawne, J. Hyde Stayner, T. M. Widrig, B. A. Travis, Ray O'Leary and Edward M. Tubbs. For the executive council of IAEI: Cliff Atkins and H. S. Morr with C. A. Klawa, first alternate, E.

Northwestern Section President Ed Tubbs (center) hands gavel to Secretary William Gaffney to give to absent President-elect Eldon Shirley. Other officers there were Don Gawne, Chris Klawa, R. Countryman, James Backenstos, Cliff Atkins, Tom Widrig, Mark Lundy. Executive Committeemen O'Leary, Travis, Stayner were absent from this photo

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M. Tubbs, second alternate, and M. H. Lundy, third alternate.

In the Southwestern Section Charles R. Pierce of Fresno was moved up to president from first vice president; Paul Davison of Mesa, Ariz., became first vice president; Walter Reed, Orange County, second vice president; Delbert Hansen, Oakland, third vice president; and Lou Fa Fehr, Alhambra, was reelected secretary-treasurer. On the executive council are E. E. Carlton, A. C. Veit, Ernest Nelson and L. O. Trim, alternates. On the executive committee Arthur Vesco, junior past president; C. H. Byland, Arizona Chapter; George Hayden, Central California Chapter; C. H. McAllister, Hawaii Chapter; I. J. Sandorf, Nevada Chapter; Robert Thompson, New Mexico Chapter; Creighton Schwan, Northern California Chapter; Glen S. Spears, Sacramento Valley Chapter; E. V. Muller, Southern California Chapter; and associate members W. A. Cyr, ELECTRICAL WEST; Nick Baer, Bussmann Mfg. Co.; and H. G. Ufer, consulting engineer.

EASA Turns to Management

Off of the winding bench and into the office management, the electrical apparatus service industry is becoming more management minded both as to shop and as to business, William Hogue, Larsen-Hogue Electric, Los Angeles, a past president of the formerly called NISA, told the West Coast Regional Conference, EASA, held at the Charterhouse Hotel, Anaheim, Sept. 22-23, with an attendance of about 60. Hogue commented that a whole conference devoted to management subjects was a healthy change as he proceeded to review a number of management aspects in finances, taxes, insurance, etc., that had been before the two-day session.

His partner George Larsen, now national president of EASA, had keynoted the meetings by discussing EASA's program of management seminars and additional courses on electronic servicing, which the association is sponsoring. Although operated at a loss last year, the management courses were felt to be needed because of the growth of the industry and the need for education in new materials, equipment, techniques and management problems.

Regional conferences such as this, he said, are currently being held throughout the country and he, himself, had just come from one in Duluth and was going to another in Pueblo.

George Larsen, EASA president, with H. O. Stump, Los Angeles Chapter president, host

The program covered shop management, moderated by Frank Search of Frank's Electric Co., Long Beach; Basic Management Principles discussed by Melville Dalton of UCLA; Industrial Relations aspect of management by Edwin Cochran of Alexander-Williams Co., Santa Ana; Purchasing and Inventory Control records by Earl Sweinhart of Sweinhart Electric, Los Angeles. Facilities and layout of a new shop on a planned basis was shown by Lloyd S. Cope of Advance Electric, Anaheim. Handling of comebacks or warranty jobs and preventing their recurrence was discussed by David Dehlinger of Larsen-Hogue Electric.

On the second day areas of office management were moderated by Mayo Baker of Littlejohn-Reuland Corp., Los Angeles. Mickey Kovall of Kovall Electric, Hollywood, described the EASA management seminar last year in Portland and urged similar ones in the future. Two industrial insurance experts, John Krehbiel of Pasadena and Frank Scolly, described the various insurances that were pertinent to their type of business. Bernard Marcus of Marcus Electric, Glendale, told how a small shop must keep competitive and yet stay in business by the sale of many accessories and extra services. A very thorough discourse into keeping of records and their value was given by Cress Crotwell, Smallcomb Electric Co., Los Angeles, after which Hogue followed to emphasize again certain points. Both declared that records should not be used merely for government report purposes (these should be a byproduct) but for guidance of the business.

H. O. Stump, president of the Los Angeles Chapter, was host chairman and Frank Williams program chairman for the successful management conference.

New in Lighting

Launching what is hoped will be an annual major trade show devoted exclusively to lighting, the Electrical League of Southern California conducted a successful one Oct. 3-5 at the Palladium in Hollywood. Its purpose was to show invited members of the industry everything that was new in light sources, fixtures and applications. This was supplemented by afternoon and evening meetings with prominent nationally known speakers. Guests included contractors, electrical and building, consulting engineers, maintenance engineers, wholesalers, architects and decorators. Some 20,000 invitations were sent out.

Conference speakers were Will S. Fisher, commercial lighting specialist, General Electric Co., Cleveland; William F. Blitzer, vice president in charge of product development, Lightolier, Jersey City; Milton Buzan, project engineer, DayBrite Lighting, St. Louis.

Fisher related lighting to air conditioning, fire protection, sound and acoustics in a talk similar to the one he gave to a series of IES meetings.

The psychological or mood-creating possibilities with light were discussed by Blitzer who showed how regulation by switching and dimming and fixture design could create the required moods.

Buzan discussed case histories of lighting improvement, showing illustrations of a number of recent installations embodying most up-to-date lighting techniques.

The trade show gave the first Western viewing of some new lamps, including the square fluorescent, iodine and new mercury lamps, several new fixture designs, ropes of fluorescent plastic tubing, electroluminescent panel light for walls, fountains with changing water and color pattern.

The exhibition and conference were planned and executed under the direction of Roy Krevser, Los Angeles Department of Water & Power and IES regional vice president; Roy Dahlin, Southern California Edison Co., lighting director; Jack Rawlins, representing Los Angeles Chapter, NECA; Mel G. Kennedy, executive vice president, Electric League of Southern California; E. C. Herron, General Electric; Lou Barrett, Sylvania; S. W. Scott, Graybar; William Shalda, Shalda Co.; P. R. Freeman, Sunbeam; N. A. Bloomberg, Lightolier; R. H. Cockfield, Department of Water & Power. A. Howard Williams was manager.

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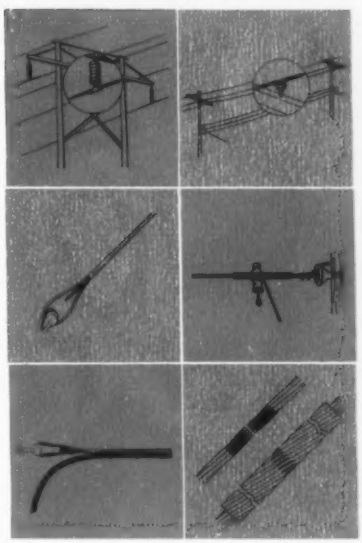

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PROTECT *your long spans at these vulnerable points*

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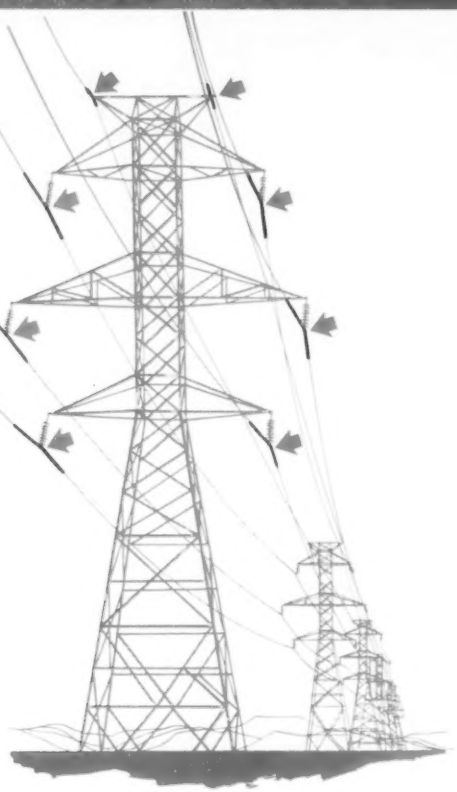

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PRODUCT NEWS

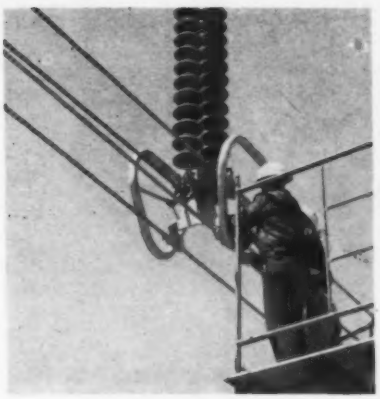
New designs and applications

Lowering Mechanism

Pfaff & Kendall

This company has announced production of a new luminaire lowering mechanism that permits ground level maintenance on street lights, area lights and floodlights. The company says it can be used to support pendant-type incandescent or mercury vapor luminaires. With this device, ground level relamping or luminaire service is convenient and economical.

Circle No. 1



Suspension Hardware

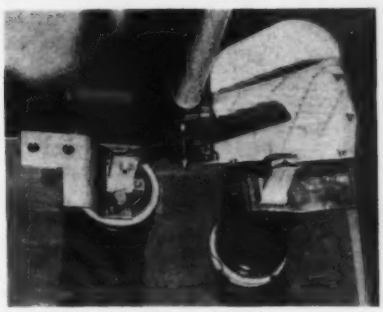
Ohio Brass Co.

Suspension hardware supplied for future EHV transmission lines may be considerably smaller and less expensive than some in use today, according to test results announced by Ohio Brass Co.

In outdoor tests conducted in the company's new "all-weather" high voltage laboratory, suspension assemblies identical to those supplied by the firm for the AEP-Westinghouse 775-kv Apple Grove experimental project have proved virtually corona free—without control rings—at voltages up to 865 kv (500 kv to ground).

The company points out that while control rings are required on the Apple Grove line to permit accurate corona and radio influence voltage measurements on the conductor, they could be eliminated for most commercial operations at the same or even higher voltages. Savings in suspension assemblies, structures, installation and maintenance, it was pointed out, would be substantial.

Circle No. 2



Load Break Switches

Westinghouse Electric Corp.

Two load break switches (air break and oil break) for integral assembly with pad-mounted distribution transformers have been announced by Westinghouse. Either switch can be used as a load break switch for removing a transformer from the line or as a sectionalizing switch to remove a high voltage feeder from service for maintenance.

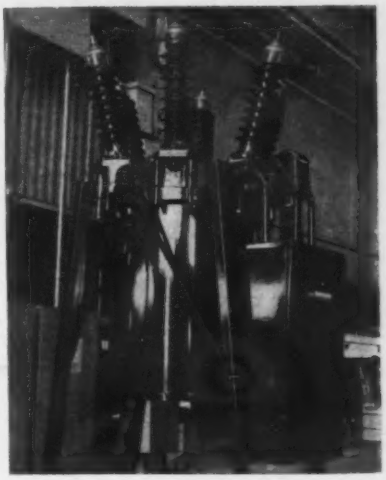
Circle No. 3

Plastic Fishtape

Cadillac Plastic & Chemical Co.

A new plastic fishtape that is nonconductive and has the strength and stiffness of conventional steel tapes has been introduced by Cadillac. The company claims the new tape can be operated in below-street vaults without hazard as it has been tested at 750 kv with no leakage.

Circle No. 4



69-Kv Single Tank OCB

Federal Pacific Electric Co.

Federal Pacific recently announced it is now producing a line of single tank oil circuit breakers in ratings up to 69 kv at its high-voltage plant at Santa Clara, Calif. The first 50 69-kv production units of the firm's new CF line of breakers are being assembled for installation on the American Electric Power Co.'s system, serving seven east central states.

The new CF breakers were selected because of their fast interrupting time, space requirements and expected reliability. The single tank subtransmission oil circuit breakers meet NEMA SG-4 and ASA-C37 standards. CF breakers are available in ratings of 23, 34.5, 46 and 69 kv at 1,200 amp. Capacity of the 23-kv unit is 500 mva; for the 34.5-kv unit, maximum rating is 1,500 mva; for the 46-kv breaker, 1,500 mva; and for the 69-kv units, 2,500 mva.

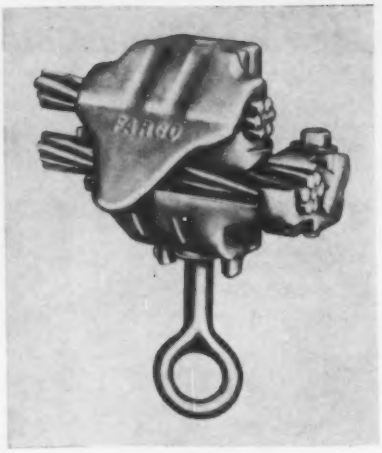
Circle No. 5

New Insulators

I-T-E Circuit Breaker Co.

Claiming substantial cost reduction in installation and maintenance, I-T-E has introduced an all-new switch and bus stacking insulator. The new line is royal blue and is available to switch manufacturers, substation erectors and utilities. Two units serve for all applications ranging from 115 through 161 kv at 450- through 750-kv BIL. The units feature a new 3-in. bolt circle.

Circle No. 6

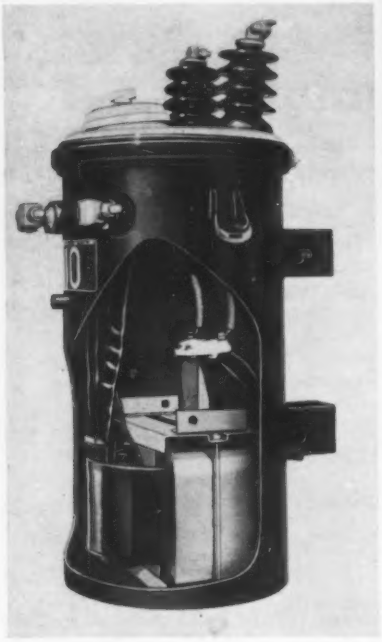


Hot-Line Connector

Fargo Mfg. Co. Inc.

Known as the HN Series, this company has designed a hot-line connector said to have sufficient current carrying capacity for main line connections and the fault currents associated with these applications. This new series of clamps is distributed through Line Material Industries.

Circle No. 7



New Transformer Coil

H. K. Porter Co. Inc.

The new line of distribution transformers, now in production by this company's Delta-Star Electric Division, are said to represent a basic design departure of internal transformer components. The new units featuring a new core design are said to be the first to use aluminum strips for the low-voltage winding.

Circle No. 8

Sealing Compound

Johns-Manville

A new sealer, called Volseal, is described as a permanently plastic rubber based compound made with inert and inorganic fillers. It is purported to have an average dielectric strength of 445 v per mil and insulation resistance of more than a million megohms. Available in both ribbon and bulk form, it is recommended for electrical sealing and insulating in the utility industry.

Circle No. 9

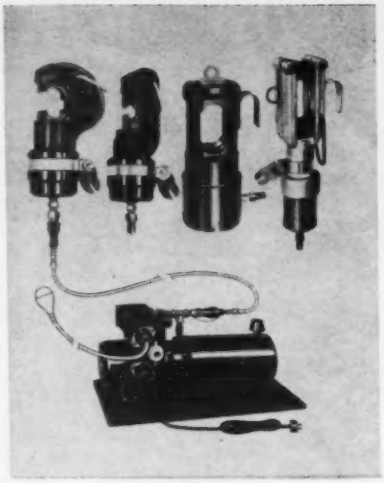
Louver Washing Machine

Wash-A-Matic Co.

A man-saving machine in cleaning louvers from fluorescent fixtures has been introduced in this company's portable lighting fixture washing machine. In the washing process the machine can wash 130 louvers at the rate of 15 louvers per minute. The self-contained unit automatically applies wetting agent, detergent, brushing, rinse spray and destaticizer to luminous ceiling panels and fluorescent fixture diffusers. Soiled fixtures are inserted into the machine from one side and are removed clean, ready for stacking from the other side.

Circle No. 10

For more information fill in coupon . . . p 93

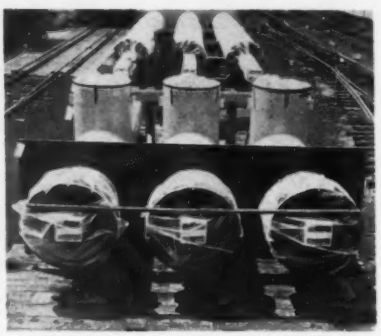


Compression Tools

James R. Kearney Corp.

A complete hydraulic, power-operated tool system, including three interchangeable compression tool heads, a power cutter head and hydraulic pump and controls, is now being offered. The tool heads can be hot-stick mounted for work on energized conductors or hand held for cold work. The manufacturer reports that the new compression tools are capable of completing connections in less than 30% of the time normally required in using hand-operated tools.

Circle No. 11



Heavy-Duty Bus

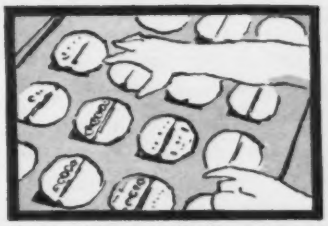
General Electric Co.

Said to be the electric utility industry's first 95-kv BIL heavy-duty bus, a unit rated 6,500 amp at 18 kv was shipped recently by this company. The new all-welded bus was manufactured in accordance with a different design, which reduces the heating in external steel to a very low level.

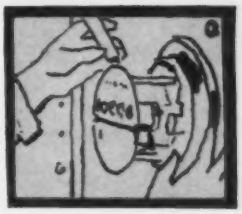
Circle No. 12

This certified seal is your assurance of meter quality.

Temperature test is one of several which prove the long-service performance of G-E meters even under extreme conditions.



Meter registers and all other parts must pass precise in-process quality control tests.



Certifying inspectors visually inspect all points of every meter before affixing seal.

ANOTHER GENERAL ELECTRIC METERING EXTRA . . .

18 tests, 356 checks assure meter quality

At General Electric, uniform meter quality is a measurable, documented fact, not an unknown. For example, G-E single-phase meters are *certified* with average accuracy within 0.1% of the reference kilowatt hour, and *certified* 99.9% free from defects which might cause improper registration or operation. And, there are nearly 13,000,000 General Electric magnetic-suspension meters now in service *without a reported bearing failure.*

Exacting quality control makes *certified* G-E meters possible. Skilled technicians and modern, automated test equipment check each meter through 18 electrical tests, 356 points of inspection before the certified seal is applied.

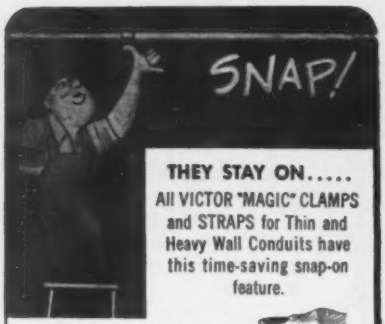
General Electric's pioneering efforts in certification provide uniform high-quality meters of known accuracy and performance, help you cut testing costs. Contact your G-E Sales Engineer for full information.

713-10

YOU GET ALL 10 METERING EXTRAS FROM GENERAL ELECTRIC

- Jet Stream Service
- Statistical Sample Testing Seminars
- Certified Quality
- Meter Courses
- Low Cost per KVA
- Application Assistance
- Product Service
- Load Building Programs
- Industry Communication
- Local Personalized Sales-Service

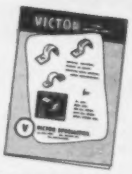
GENERAL ELECTRIC



THEY STAY ON.....
All VICTOR "MAGIC" CLAMPS and STRAPS for Thin and Heavy Wall Conduits have this time-saving snap-on feature.

Contractors everywhere are switching to VICTOR. Cash in on this heavy demand. Add these fast selling, profitable Clamps and Straps to your line.

Write for the new Victor Strap Catalog. Lists over 600 items to fasten Wire, Cable, Tubing and Conduit.



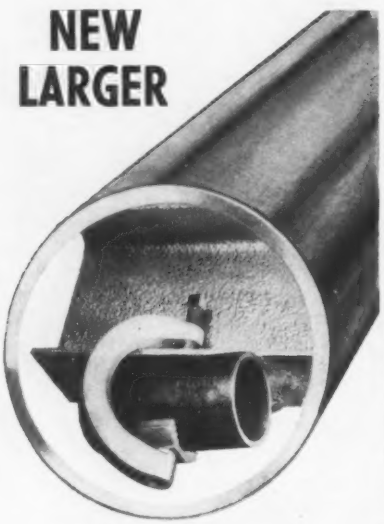
VICTOR SPECIALTIES, INC.
775 MAIN ST., NEW ROCHELLE, N.Y.

The Greatest Single Source for Clamps and Straps

California Representatives:

STANLEY SALES CORP.	HAYJAX COMPANY
1122 Folsom Street	436 Colyton Street
San Francisco 3, Calif.	Los Angeles 13, Calif.
Phone: UNderhill 3-8900	Phone: MA 8-5256

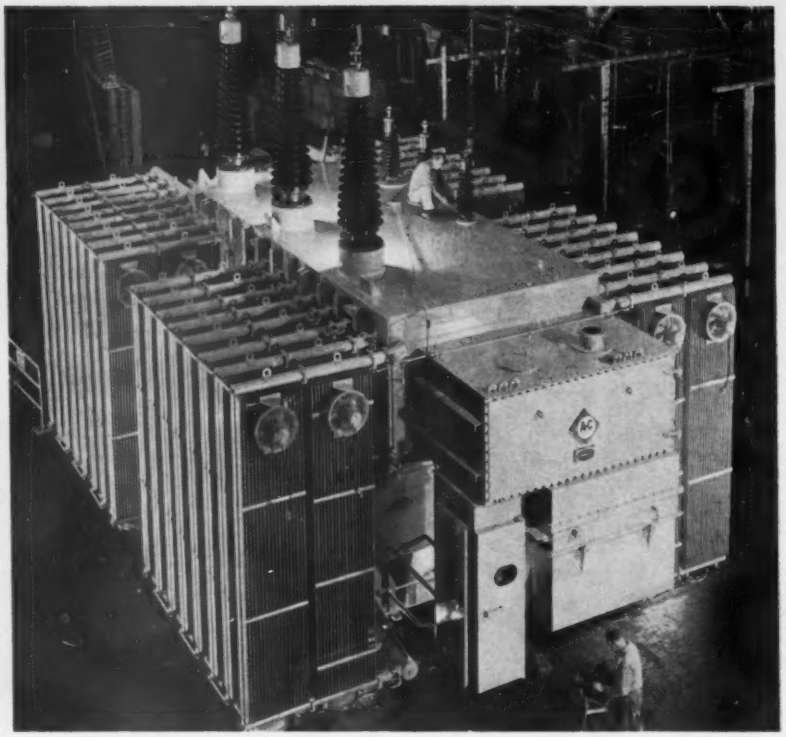
NEW LARGER



PIPE OR CONDUIT HANGER

This New #472-473 Conduit Clamp accommodates NEW SIZES—1½" thru 2½".
The saddle or pipe support can be turned 360°, permitting pipe to run parallel or at right angle.
Made of highest grade malleable iron, with case hardened set screw—all cadmium plated.
Excellent for confined areas. No drilling or need for straps.

FULLMAN MANUFACTURING CO.
LATROBE PENNSYLVANIA



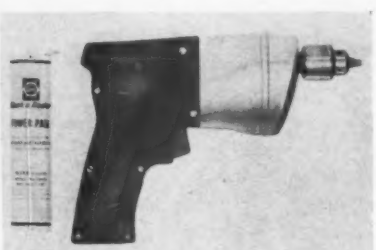
Light Power Transformer

Allis-Chalmers Mfg. Co.

Allis-Chalmers tells of design progress in large three-phase power transformers in a unit rated 150,000/200,000/250,000 kva, 220,000-v grounded wye for the Southern California Edison Co.

The company says the 22% weight saving over previous units is due in part to the fact that this design does not require an auxiliary series transformer for load tap changing. A standard load tap changing mechanism incorporated in the delta winding performs this function.

Circle No. 13



Portable Tool

Gould-National Batteries Inc.

Recently released specifications describe the new power cells used in the Black & Decker ¼-in. cordless electric drill. Power for the drill is furnished by a compact, lightweight, rechargeable nickel cadmium battery. Hermetically sealed and maintenance free, this battery will deliver enough power to drill 75 ½-in. holes in ⅞-in. fir lumber, or over 100 ⅛-in. holes in 16-gage steel on one charge.

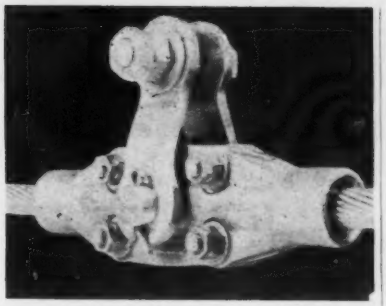
Circle No. 14

Fiber-Glass Boom

U. S. Air Conditioning Corp.

The Hughes-Keenan Division has announced an all-new fiber-glass boom that is available on Skyworker aerial lifts. The boom construction is of high modulus woven roving cloth impregnated with self-extinguishing polyster resin. At the work platform or outer end of the boom, bearings and idler sheaves are nylon, thereby eliminating any need for greasing and any possibility of dirt contamination. The drive sheave at the leveling system is protected at wear surfaces by dry lubrication, while a fiber-glass shaft and a reduction of the number of metallic parts in the area of the work platform make possible the maximum flashover gap.

Circle No. 15



Aluminum Suspension Clamps

Alcan Industries Ltd.

This company's new clamp was designed so that, when the bolts are tightened, the conductor is gripped in such a way that further tightening will not result in the conductor's strands being subjected to increased pressure. To this clamp has been added a weatherproof feature. The clamp consists of two identical halves which are bolted around the conductor. Side pinions are incorporated to insure pivoting about the conductor center line, making it impossible to damage the clamp when fitting, since once the two halves are in contact, no amount of overtightening of the bolts can have any effect.

Circle No. 16

Switch Lock

Harvey Hubbell Inc.

A new switch locking cover attachment, a safety device which assures positive control of electrical switches, has been introduced by this company to fit any metal wallplate. Equipped with a Yale tumbler lock and set of keys, it eliminates the possibility of unauthorized persons tampering with the switch.

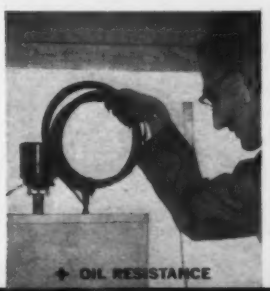
Circle No. 17

MOST NEOPRENE
THE BIG PLUS
IN
BRONCO Certified 66 NEOPRENE

PORTABLE ELECTRICAL CORDS AND CABLES

On top of all of the features you have ever asked for in a portable electrical cord or cable you get the most Neoprene in Bronco 66 Certified. This is your assurance that you will receive all the protection and service life a Neoprene jacket is capable of providing. Furthermore, you know what you are getting; a Registered Professional Engineer stakes his integrity and reputation on the Bronco 66 jacket by certifying—you'll find a registered certification on each and every carton and reel—that it contains not less than 67.32% Neoprene. You will also find the figures molded* into the jacket at exact two-foot intervals, "BRONCO 66 CERTIFIED —67.32% NEOPRENE" ...Why accept less?

*U. S. PATENT 2867001



The plus-value 67.32% Bronco 66 jacket is found on a complete line of portable electrical cords and cables—Types SO, W, G, Control, Welding, PG & PCG, W-P&R, and High Voltage 3KV & 5KV Types W, G, and SH.

BRONCO WESTERN BRED FOR STAMINA

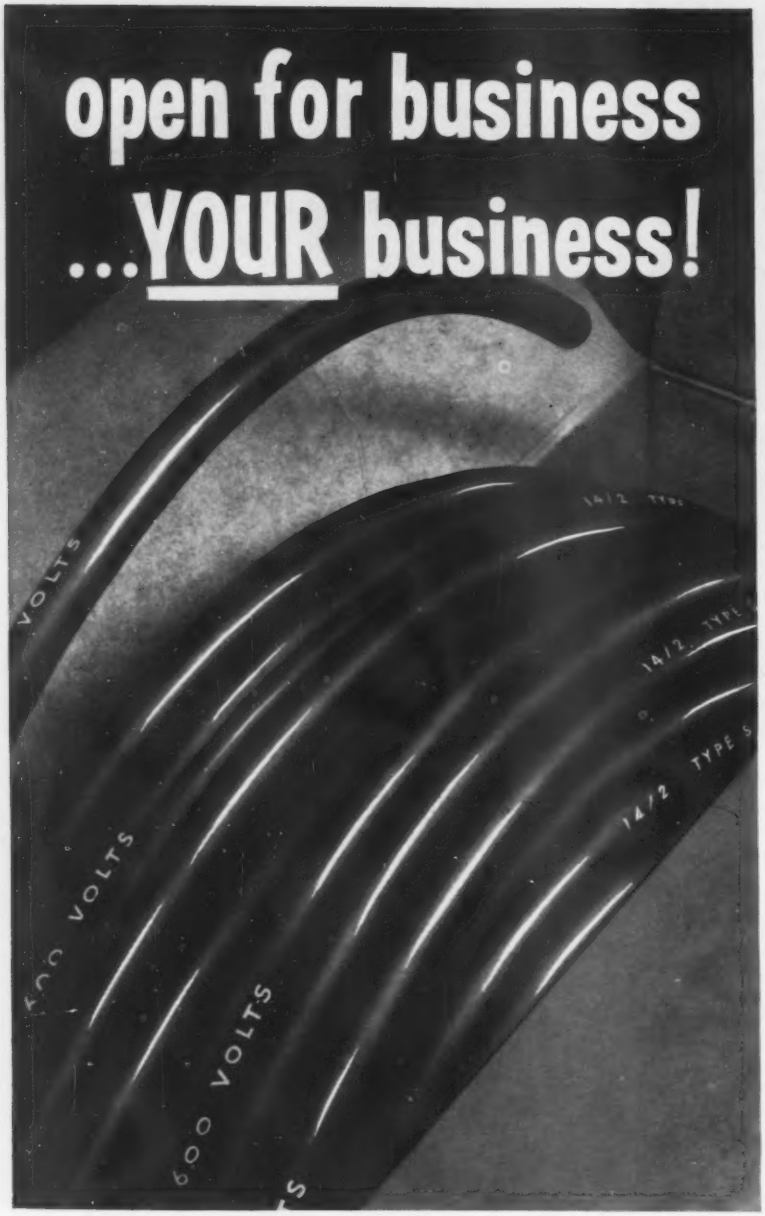
Bronco Wires and Cables are sold through Electrical Wholesale Distributors and are manufactured by

WESTERN INSULATED WIRE COMPANY

LOS ANGELES 58, CALIFORNIA

Bronco Representatives in the West:

CALIFORNIA, Western Insulated Wire Company, (Home Office) 2425 East 30th St., Los Angeles 58; Electrorep, Inc., 672 Townsend St., San Francisco 3; **NEW MEXICO,** John Carder, Jr. Co., 1624 N. 1st St., N.W., Albuquerque; **OREGON,** Associated Electrical Agents, 1003 S.E. Grant St., Portland 14; **UTAH,** John Carder, Jr. Co., 1415 So. Main St., Salt Lake City; **WASHINGTON,** Associated Electrical Agents, 1000 Fourth Ave. South, Seattle 4.



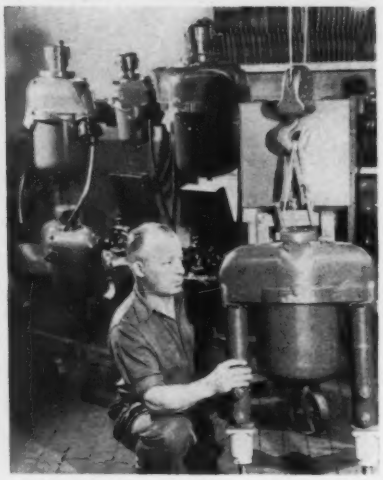
ROYAL Portable Cords

Open a carton of Royal portable cord and you *know* you're getting the easiest handling, fastest working cord available anywhere. Flex it, crimp it, strip it . . . and you can see why Royal cord meets *all* your job requirements for flexibility, safety, and durability. Royal's reputation for quality and dependability rate Royal Cords *first* among electrical men from coast to coast. Your wholesaler has a complete range of cord types and sizes — rubber, neoprene, plastic jackets — fixture wires, lamp cords — thermo cables, coaxial cables, bell and machine tool wires, and more. They're made right, packaged right, priced right—start to use them today!

ROYAL ELECTRIC ...an associate of ULC

ROYAL ELECTRIC CORPORATION
PAWTUCKET, RHODE ISLAND
In Canada:
Royal Electric Company (Quebec) Ltd., Pointe Claire, Quebec

SALES REPRESENTATIVES AND WAREHOUSES: Los Angeles—1950 Naomi Avenue, KI 7-9333; San Francisco—1225 Sixth St., HE 1-5792; Seattle—4130 First Ave., So., MA 3-8882; Phoenix—221 E. Camelback, CR 7-1662 Denver—110 Yuma, SH 4-1351

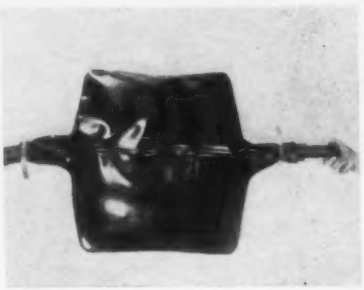


Oil Cutouts

General Electric Co.

General Electric's lightning arrester and cutout section, Pittsfield, Mass., now offers a complete line of oil cutouts from 15-kv sealed units to 5.2-kv vented. Both the sealed and vented cutouts in 5.2 kv to 15 kv are now offered to provide load break operation and overcurrent protection on electric utility and industrial plant distribution systems. The units are said to be 29% smaller and 41% lighter than other comparable units.

Circle No. 18



Splice Covers

The Zippertubing Co.

Protective splice covers of polyvinyl chloride, which are easily wrapped around areas of cables and locked on by a plastic zipper closure, are now available. When the ends of the Zippertubing splice covers are clamped or taped to the cable, an effective moisture barrier is created. Tracks of the zipper closure may be permanently fused together with a sealer that provides a permanent watertight protection for the spliced area.

Circle No. 19

MANUFACTURERS' LITERATURE

For fast action in securing the manufacturers' literature listed below and more information on new products described in the preceding pages, use the coupon below. Circle the items wanted and mail to Electrical West

VACUUM SWITCH—In its bulletin 71B-9754 Allis-Chalmers describes a low-cost vacuum switch designed for capacitor duty. Smaller and less than one-third the weight of oil switches, the type VSC vacuum capacitor switch costs no more than three-phase oil switches, the bulletin points out. Included is information on the hows and whys of vacuum switching, how to order these switches, specifications and dimensions for the type VSC, and a three-phase capacitor bank application guide. *Circle No. 20.*

AREA LIGHTING—General Electric's bulletin GET-3100 is an area lighting reference for professional applications. It describes basic functions of luminaires, both street-lighting and floodlighting types, with photometric data and sample problems for roadway lighting and area lighting applications. Included is a discussion of economic considerations for design selection, with technical standards by which to measure choices. Tables of lamp data also are included. *Circle No. 21.*

NETWORK TRANSFORMERS—Kuhlman bulletin CS-601 gives data on network transformers, 5 kv through 15 kv, with oil or nonflammable liquid. Standard accessories are listed. A page is devoted to networks from 15 through 34.5 kv. *Circle No. 22.*

REELS — A 10-page catalog from HyKon covers the company's line of wiring reels, wire and cable measuring equipment and other electricians' tools. *Circle No. 23.*

POLE TOPPER—Data sheets on its pole topper and pole topper fluid are available from Osmose Wood Preserving Co. For these data sheets *circle No. 24.*

POLE-MOUNTED SWITCHES — Bulletin 1130B from Greensburg Division, I-T-E Circuit Breaker Co., gives complete data on new vertical configuration, line tap-off and sectionalizing switches. Two types of side-break switch mountings are illustrated, Alto showing upright mounted switches and Savar showing horizontally mounted switches. Both types are available for one- and two-way switching, and Alto switches are also available for three-way switching. Dimensions are listed for ratings 34.5 kv through 138 kv, for both 600 and 1,200 amp. *Circle No. 25.*

CLAMPS—Jasper Blackburn Corp. is offering a new data folder on its line of two-bolt connectors and cross tap clamps for heavy-duty copper connections. These Duronze clamps provide full contact for all rated wire sizes and accommodate practically all connections up to two 1,000 mcm, the manufacturer states. For a copy of bulletin 6108, *circle No. 26.*

MAINTENANCE AID — Pfaff & Kendall has issued a six-page bulletin on its new lowering mechanism for luminaires. The device permits lowering to ground level for relamping or other maintenance. *Circle No. 27.*

INDUSTRIAL FINISHES—A 16-page bulletin on silicone-based industrial finishes and their capabilities is available from G-E's Silicone Products Department. For publication CDS-294 *circle No. 28.*

TRANSFORMER—Line Material's bulletin 61202 covers the manufacturer's self-regulating transformer. Included are operating and design features and ordering data. For copy of this bulletin *circle No. 29.*

ELECTRICAL WEST *Not good*
255 California St., San Francisco 11, Calif. *after January 1*

Please send me, without obligation, the new product information or catalogs.

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME ..... TITLE .....

COMPANY .....

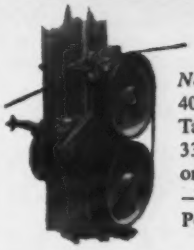
ADDRESS .....

CITY ..... ZONE ..... STATE .....

***Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.**

NEW

PENGO POLE-MOUNT TENSIONER



Now...PENGO 4000 Tensioner Takes Conductor to 336,500 cm-ACSR or 397,500 cm-AAC —Tensions to 1,000 Pounds!

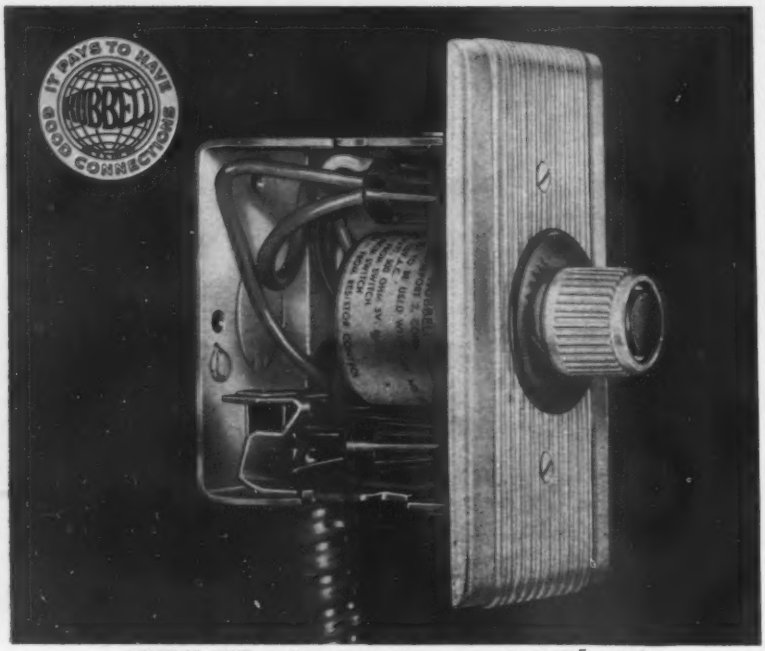
Here's a bullwheel tensioner you can carry in every line truck! It features two 18 inch neoprene lined bullwheels. Tru-Stop disc brake — yet weighs so little it's truly portable.

Two men can easily place the 4000 PM against the pole, attach it (chains and wing-nut tightener are permanently attached to tensioner), and start stringing in a matter of minutes. Conductor can be payed off any suitable reel stand. A collapsible reel attached to a winch shaft makes a practical puller, although any type of power previously used for pulling can be used.

TENSION WIRE STRINGING is the safe, economical modern way to string distribution and transmission lines. Why not get the facts? Write for new PENGO catalog TSE-1 for full data on the world's largest, most complete line of tension stringing equipment. Please address Dept. 34.

PETERSEN ENGINEERING CO., INC.
460 Kifer Road
Santa Clara, California
Phone: AXminster 6-7712

B-15



CONTROL UNIT consists of potentiometer, standard 4½" x 2¾" switchplate (brown or ivory), and matching gold-trimmed knob.

FASTER TO INSTALL

"HUBBELL-TROL" DIMMER

FITS STANDARD WALLBOXES

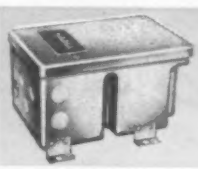
- No Transformers or Rheostats to Mount in Wall
- Dims Incandescent and Fluorescent on Same Circuit
- Uses Standard Switchplates, Single or Ganged

Not a rheostat . . . not an autotransformer . . . the new "Hubbell-trol" Dimmer operates on the saturable reactor principle. It needs no special wall construction for mounting transformers . . . no oversized wallboxes and switchplates.

All you do is wire the compact potentiometer control unit into a standard wallbox taking a standard plate. The aluminum box containing the toroid coil may be surface-mounted anywhere: in cellar, closet, or attic.

One "Hubbell-trol" unit handles up to 600 watts of incandescent alone, fluorescent alone, or incandescent and fluorescent combined. No auxiliary equipment is needed with fluorescent.

Find out more about this truly remarkable manual dimmer. Your Hubbell distributor will demonstrate it for you. Or write now for catalog page and prices.



Toroid Box SR-600-S for remote mounting

Hubbell-trol DIMMER

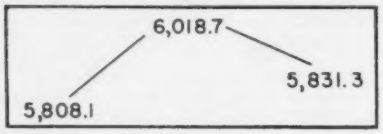
"Hubbell-trol" is a trademark of Harvey Hubbell, Inc.

HARVEY HUBBELL, INCORPORATED Bridgeport 2, Connecticut

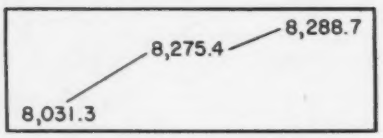
WESTERN

Economy at a Glance

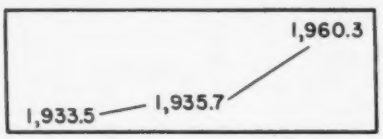
Year Ago	Month Ago	Latest Month



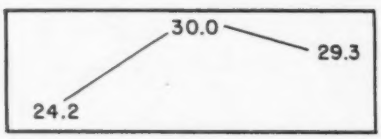
PERSONAL INCOME in millions—seasonally adjusted as of October 15 (An index of consumer spending potential)



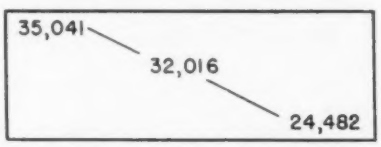
NONFARM EMPLOYMENT in thousands (Index of industrial, commercial activity)



MANUFACTURING EMPLOYMENT in thousands (A measure of manufacturing activity)



HOUSING STARTS in thousands of units (Index of new residential customers)



INDUSTRIAL BUILDING CONTRACTS in thousands of dollars (A rough index to the dollars of electrical contracting business six months to a year ahead)

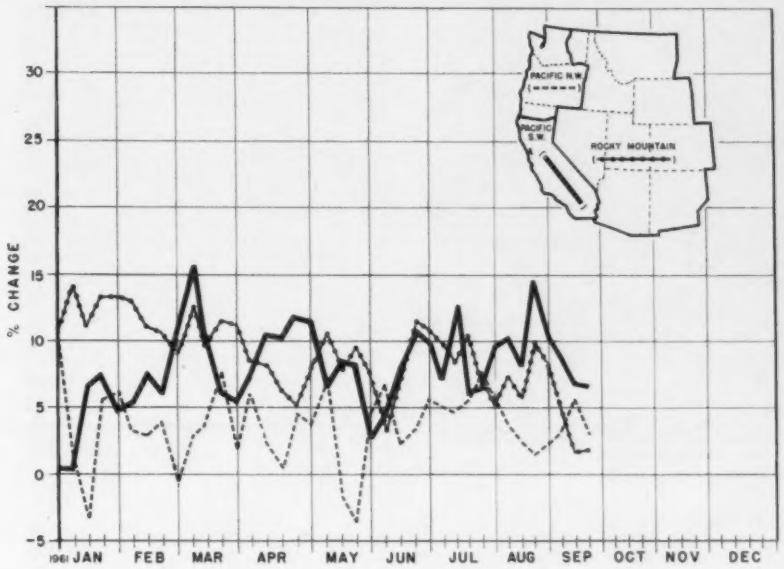
► Regionally, only two areas—the South and Far West—still post gains in construction over the first nine months of '60 of 7% and 6%, respectively. New England is down a sharp 26%, Middle Atlantic 5%, Mississippi-to-Rockies region 6%, and the Middle West 4%. California continues to hold its lead over New York for the third consecutive year with close to $2 billion new construction already signed up for this year.

Source: Engineering News-Record

BUSINESS TRENDS & INDICATORS

Output Comparisons

Year-to-Year Kwh Output Changes. Per Cent Change Over Same Week. One Year Ago for Region as Indicated in Keyed Map



Business Prospects for 1962 Are Bright

Assuming that we are not going to get into war—limited or any other kind—over Berlin, new economic records are certain to be set right down the line. The Gross National Product, the total value of all goods and services produced in the nation, is expected to register a solid gain of $45 billion in 1962, or 9% over this year. Prices, on the average, are likely to increase 1½%, so the real gain in GNP will be about 7½%. Industrial output is expected to rise about 12% over this year's figure.

No big boom in residential construction is expected in 1962. Although applications for FHA commitments and requests for VA appraisals, two indications of future homebuilding, have firmed up in recent months, they are not signaling any big burst of activity. Thus, foreseen is a housing starts figure of about 1,450,000 units next year compared with just under 1,300,000 new dwelling units this year. Next year's total will still be nearly 5% below the previous record.

RELATIVE WHOLESALE PRICES OF ELECTRICAL MATERIAL

	LATEST MONTH	PREVIOUS MONTH	YEAR AGO
Wire and cable	131.0	130.5	131.3
Watt-hour meters	118.6	118.6	120.9
10-hp motors	127.5	136.9	132.0
225-hp motors	176.8	176.8	227.9
Hydro generators	185.5	185.5	185.5
Steam generators	174.8	174.8	203.5
15-kva transformers	130.6	131.2	133.2
50-kva transformers	128.0	129.8	134.7
500-kva transformers	131.5	133.4	147.1
Dry-type transformers	133.7	133.7	146.0
Switch and fuse panelboards	126.4	126.0	132.4
Circuit breaker panelboards	139.5	139.2	136.7
Indoor oil circuit breakers	182.4	182.4	182.5
Outdoor oil circuit breakers	165.1	165.1	178.7

DEPENDABLE PROTECTION AT LOW COST

Crapo
GALVANIZED STEEL STRAND

The strong, tough individual wires which make up **Crapo** Galvanized Steel Strand are protected against corrosion by a uniform, tightly-bonded, ductile coating of commercially pure zinc. This heavy, dense coating of zinc, applied by one of the time-proven **Crapo** methods, not only seals out rust but further protects the base metal by sacrificing itself through galvanic action. The result: long and dependable performance at low yearly cost.

A B C
CHOOSE FROM 3 COATING WEIGHTS

Crapo Galvanized Steel Strand is available in three weights of coating, Class A, B and C. Class B has twice the zinc by weight per square foot of wire surface as Class A; Class C has three times that of "A."

Contact the **Crapo** Galvanized Steel Strand distributor near you for prompt shipments from his stock or from our mill.

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Growth Town, U.S.A.

You are looking at part of one of the fastest growing areas on earth: Los Angeles is the third largest U.S. city in population; the biggest in area covered.

The city itself has nearly 2.5 million inhabitants . . . spreads 50 miles north and south, 30 miles east and west . . . and is a center for making aircraft, electronic equipment, and sports clothes as well as motion pictures and dozens of other products.

But its fame rests on growth — fabulous, booming, American growth — in population and wealth.

Sustaining that growth are three trans-continental railroads which terminate there . . . and a large investor-owned and a municipal electric utility system.

Kerite, whose own history began in 1854, has played its part in this growth. And just as Los Angeles has kept faith in its future, so, too, has Kerite made its cable for the future — for the *permanent satisfaction of every customer . . . through dependable performance year after year.*

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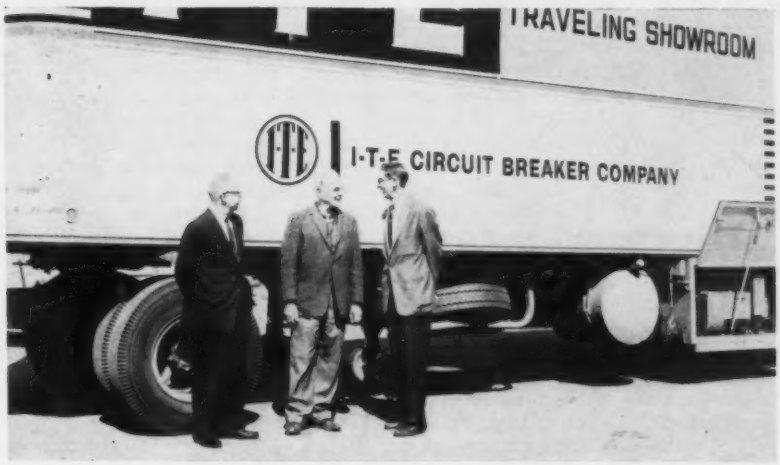

I-T-E's traveling showroom as it stopped in Boise, Idaho, recently. Discussing the display are H. W. Howells, Riter Engineering Co., and Lawrence Gossi and Don E. Haasch of Idaho Power. I-T-E Regional Manager Bob Petersen says the display has been in the region for 3½ months, visiting 1,000 people of 100 utilities, in 14 major cities

► **Prescolite Mfg. Corp.,** which was founded in a Berkeley garage in 1944, will move its California operations to San Leandro, where it has taken over a million-dollar plant. The move, to be completed by the end of the year, will consolidate the firm's lighting fixture manufacturing operations into one building and will expand space by some 20%. Prescolite is remodeling the offices, building a display showroom and installing a large conveyor and bonderizing system for spray painting and cleaning.

► **Electromode** has appointed **Donald S. Gleason & Associates** as its sales representatives in the Pacific Northwest. The firm, which has headquarters at 4710 University Way, Seattle 5, maintains sales engineers in Portland and Seattle and plans to open an additional office in Spokane.

► **RCA** has moved its Seattle Electronic Data Processing Division office to new and larger quarters in the Washington Building. The office formerly was located at 2250 First Ave. S.

► **Brand-Rex Division,** American Enka Corp., has appointed the Leed Mfg. Co. of Los Angeles as an authorized fabricator. Leed is located at 781 E. Pico Blvd.

► **Koppers Co.** has announced expansion plans for its Oroville, Calif., plant, according to Douglas Grymes Jr., vice president and general manager. The construction, to be completed early in 1962, will permit the company to pressure treat lumber, poles, crossarms and plywood with its "Cellon," which uses liquefied petroleum gas in a pressure vessel to deposit preservative chemicals in the wood fibers.

► **W. L. Thompson** has been named district sales manager for **A. O. Smith Corp.** in the Western states. Announced at the same time by C. M. Poston, general sales manager for the Electric Motor Division, was a shift in headquarters from Newark, Calif., to Los Angeles. With A. O. Smith for 15 years, Thompson was assistant to the Electric Motor Division's general manager before coming West. His new Los Angeles quarters are at 550 S. Flower St.

Thompson

► **Charles A. Kautzer,** widely known Bay Area electrical engineer and control specialist, has been named chief engineer for **Rundel Electric Co.,** headquartered in Millbrae, Calif. Formerly chief electrical engineer for Brown & Caldwell, internationally known San Francisco firm of consulting engineers, Kautzer designed many electrical control systems, reactor controls and process instrumentation for water works, storm drainage, sewage treatment and other installations.

► **Maurice Winger Jr.,** general manager for the **Brand-Rex Division,** American Enka Corp., has announced additional appointments at the new Brand-Rex wire and cable plant in Gardena, Calif. **Frank G. Stefkovich** has been named assistant plant manager and **R. C. Babbit** quality control manager. Stefkovich served for several years as product engineer at the Willimantic, Conn., plant and most recently has been Western regional sales manager. Babbit was transferred to the West Coast to supervise quality control.

► **Thermador Division** has appointed **John F. Sorenson** as heat pump and air conditioning sales manager. According to **Jack Meany,** general manager of Thermador Division, heat pumps and air conditioners will be distributed in the southern California area initially. Distribution will be expanded on a nationwide basis in areas where air conditioners and heat pumps can be used economically and efficiently.

Sorenson

► **Shaffer & Nelson** of Seattle has been appointed sales representative for Wheatland Electric Products Co. with territory covering Washington, Montana, Oregon and northern Idaho. **W. H. Hunt** of Los Angeles, Wheatland's Western sales manager, will have general charge of operations, according to Robert C. Bennett Jr., president of the firm. Shaffer & Nelson will handle the sale of the manufacturer's underfloor duct and header duct through its offices in Portland, Spokane and Seattle.

► **Arthur A. Gingell** has formed his own manufacturers' representative company known as A. A. Gingell Co. at 66 Ritch St., San Francisco. The lines he represents are Collyer Insulated Wire Co. of Pawtucket, R.I., Carol Cable, Harvey Aluminum Co. of Torrance and Baldwin extruded products.

► **Edmund N. Bowles** has been appointed representative for Blakeman meter panels in the northern California area. His address is 3701 Kingridge Drive, San Mateo.

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Write for Bulletin 91a.

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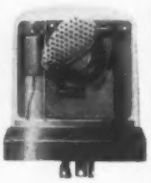

**Lumatrol Mark II, for 230 Volt circuits, is described in Bulletin 92.*

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NELPA Conference

(Continued from page 74)

Bureau sessions, the means for exchanging ideas and experience, were well planned and well attended. The Electric Home and Farm Bureau, chairmanned by James Mowery, Copco Division, PP&L, opened with reports on two personal interview research programs. Bob Pitzer told the findings in Puget Power's recent survey of electric heat customers. Of those interviewed, 89% found no disadvantages; 93% think their bills are either reasonable or low; 66% would make no changes if they were to install again. Rollie Gabel, reporting on a study of appliances in use and wanted by PGE customers, said 49% wanted electric heat; 45% could define Medallion Home correctly and 55% (94% after visiting a model all-electric home) knew it was electrically heated.

New ideas in agricultural electrification were presented in a session planned by P. R. Mortimer, Idaho Power, the bureau's vice chairman. Revenue from residential lighting was considered by a panel including W. A. Lowry, WWP, Jay Elliot, PP&L Copco Division, Wendell Phelps, G-E. A panel discussion moderated by D. L. Holt, UP&L, took a look at home service, the Gold Medallion Home and wiring. Panel members, W. S. Farsje, Puget Power, Mortimer and Frank Rush, PP&L, presented some workable ideas and stirred up discussion.

That an air conditioned school costs less to build than one not so equipped was the surprising good news given to the opening session of the Commercial and Industrial Bureau under Chairman A. B. Couch, Puget Power, by James Gardiner, architect of Portland and San Francisco. Citing three schools recently completed and in operation which he designed, he attributed the savings in construction to these factors: (1) site orientation is no problem; (2) design, thus, can be more flexible and economical; (3) inside rooms are feasible; (4) windows can be fixed and seasons can be ignored in the design. From the school's standpoint there is less absenteeism, more efficiency. Of the three schools, each with a different modular plan for flexibility, total construction costs ran to about $10 per sq ft, of which the electrical ran around $1.50, plumbing and heating around $2.75.

Following up on Architect Gardiner's talk, C. W. Jarrett, PGE, described the instrumentation being set up in six totally electric schools to determine exact figures as to electric usage, the load shape, separation of other electric loads such as lighting, cooking, water heating, etc., to provide tools for further development of the total electric concept.

Beverly A. Travis, electrical engineer for site development for Seattle's "Century 21" World's Fair in 1962, described its features, particularly plans for the electrical industry's exhibits and the electrical distribution systems.

Paul Markavage, G-E, Seattle, discussed the competitive threat of the united front of AGA as compared to the far lesser effort on the part of the electrical industry for commercial cooking business. He recommended a good hard offense as the best defense.

A panel led by W. R. Reed, Idaho Power, discussed three markets for large volume water heating—swimming pools, hydronic heating, commercial hot water supply. Ken Hollingsworth, Puget Power, brought data on a number of private home pool installations as well as several commercial ones where the water heating electrically.

Wes Dunn, PP&L, outlined a sales package for continuous promotion of restaurant or large volume water heating electrically

Of hydronic heating, defined as space heating using hot water as a source, Howard Peterson of Coates Electric, Seattle, described advantages of electricity as a source for the hot water supply.

Homer Shaw, Utah Power & Light, described conversion of the original three lamp carbon arc street lighting system along Main Street of Salt Lake City to a new three unit T-type fluorescent fixture.

Special improvement districts for the financing of modern street lighting have been found an effective means and a popular one in Montana, according to L. D. Regan, Montana Power, Great Falls.

Will S. Fisher, applications engineer, G-E, Nela Park, Cleveland, who later discussed the integration of lighting and heating, presented the commercial bureau with some ideas for the use of heat lamps for special heating applications. Both the reflector-type incandescents and the new quartz tubular lamps were shown in use to heat the sidewalk areas over department store fronts, marquees. He also showed the use of heat lamps to do "people heating" in industrial plants, gymnasiums, around pools, outdoor band shells.

The individual committees, now

called permanent standing committees, met on Tuesday afternoon to discuss their projects and studies.

Public Relations and Advertising

PR and advertising men turned their attention to such subjects as the large use customer, the communist threat, school public relations programs in sessions planned by Chairman Fritz Cochrane, Idaho Power.

The Value of Service pitch to combat large bill complaints given at the Denver PIP Workshop by John Dierdorff, PP&L, and James McCollum, PG&E, was presented by Jack Foley and Roger Thompson.

Howard Cleavinger, managing editor of the *Spokane Chronicle*, advised the group to be builders of understanding, not press agents. He counseled telling the whole story to build public confidence and to get unfavorable facts out in their proper perspective; keeping avenues "open to the horse's mouth"; making important people available through interviews rather than press conferences; remembering to report human interest items.

A presentation by Dr. Edwin Graue of the University of Idaho, "An Industry Is What Kind of People," gave the group a stimulating exercise in development of a basic idea.

Rate Research

Load surveys of the type it started this year will be continued over long periods, the Rate Research Committee decided. Automation is permitting these studies in detail that was impossible before, Chairman Ben Gadeholt, PP&L, pointed out.

The group is half way through a residential study of four classes of customers: (1) have neither range nor water heater; (2) have added major appliance; (3) have range and water heater; (4) have house heating. Each of the participating companies runs a test of five typical customers and the information is pooled. The next survey will be in the commercial field.

Such problems as area lighting and underground service were discussed in bull sessions. A new project is a review of current literature to keep members informed.

Hardworking as it was, the conference was by no means without play. The Roarin' 20's Hour chairmanned by Bill Smith, Line Material, and the banquet entertainment put on by an all-WWP cast were outstanding.

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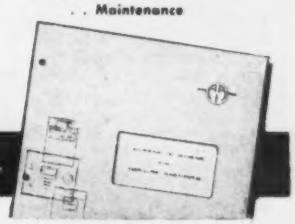

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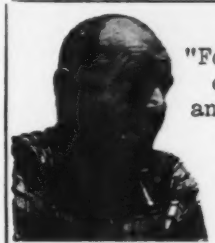

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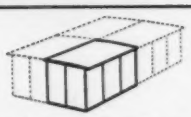

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INDEX TO ADVERTISERS AND WESTERN SALES OFFICES

November 1961

Allis-Chalmers Mfg. Co. 21, 23, 25
San Francisco ..... DOuglas 2-8384
Los Angeles ..... MAdison 6-2231
Phoenix ..... CRestwood 4-5426
Denver ..... CHerry 4-6556
Salt Lake City ..... EMpire 3-1723
Portland ..... CApitol 2-9835
Seattle ..... MAin 4-3737
Spokane ..... FA 7-1581
San Diego ..... BE 2-7355

Aluminum Co. of America 10, 11
San Francisco ..... YUkon 6-6484
Los Angeles ..... HUntley 2-2684
Denver ..... DUdley 8-1619
Spokane ..... RIverside 7-6124
Seattle ..... MAin 4-4040
Portland ..... CApitol 2-9861
Boise 2-8038
San Diego ..... CYpress 8-9326
Phoenix ..... ALpine 4-9248

American Steel & Wire Div., U. S. Steel Corp. 72, 73
Columbia-Geneva Steel Div. in following cities:
San Francisco ..... SUtter 1-2500
Los Angeles ..... LUdlow 5-1171
Portland ..... CApitol 2-9534
Seattle ..... MAin 2-1972
Salt Lake City ..... DAvis 2-0491
Denver ..... AM 6-3001

Anaconda Wire & Cable Co. 22
San Francisco ..... PRospect 6-4111
Los Angeles ..... RAymond 3-0581
Denver ..... AComa 2-0616
Seattle ..... MAin 3-4686
Salt Lake City ..... DAvis 8-0616
Phoenix ..... AMherst 0581

Associated Research, Inc. 99
San Francisco:
California Instrument Co. ..... UNderhill 3-0350
Los Angeles: Brenner-Fiedler Associates, Inc. ..... WEbster 3-3811
Seattle: Eicher & Co. ..... ATwater 4-1811

Bailey Meter Co. 4, 5
Branch Offices:
San Francisco ..... SUtter 1-0926
Monterey Park, Calif. ..... CU 3-1187
Denver ..... EAst 2-7745
Seattle ..... MA 4-7192
Portland ..... BEImont 2-3440
Salt Lake City ..... CR 7-5251

Bechtel Corp. 102
San Francisco ..... DOuglas 2-4032
Los Angeles ..... MAdison 6-6721

Blackburn Corp., Jasper 83
San Francisco: Donald E. Ingalls ..... JUniper 6-0332
Los Angeles: Robert M. Schow ..... HUbbard 3-7931
Vancouver, Wn.: Wm. A. Horning ..... OXford 4-4475
Phoenix: W. C. Osborn ..... Windsor 3-1815
Denver: Sales Engineers Co. ..... AComa 2-4893
Salt Lake City:
James D. Stephens Co. ..... EMpire 3-7402
Albuquerque: Ralph B. Black ..... AMherst 5-0144

BullDog Electric Products Div., I-T-E Circuit Breaker Co. ..... 7, 3rd Cover
Denver: Young Elec. Mfg. Co. ..... AComa 2-4841
Salt Lake City:
Stevens Sales Co. ..... INgersol 7-5489
Los Angeles:
BullDog Elec. Prod. of L. A. ..... ANgelus 9-8101
Portland:
Coast Electric & Mfg. Co. ..... ATlantic 8-5373
Seattle: Coast Electric & Mfg. Co. ..... MAin 3-4750
Oakland:
Safety Switchboard Co. ..... LOckhaven 9-7001
Sacramento:
Safety Switchboard Co. ..... GIlbert 1-0273

Circle Wire & Cable Co. 20
Sub. of Cerro de Pasco Corp.
San Francisco: Brill Electric Sales ..... SUtter 1-7547
Los Angeles: Elkins Electric Agency ..... ANgelus 8-3385
Seattle: Electric Agencies ..... MAin 3-2360

Columbia-Geneva Steel Div. 72, 73

Conduit Nipple Mfg. Co. 102
San Francisco: George Gray ..... HEmlock 1-1526
Los Angeles: Hayjax Co. ..... MAdison 8-5256
Denver: Reitz Sales ..... EAst 2-6200
Portland: Pacific Electric Sales ..... BEImont 5-4137

Delta-Star Elec. Div. (See H. K. Porter Co. Inc.)

Electro Compound Co. 102
Los Angeles: W. E. Starr Co. ..... AN 9-0371
Portland: Oregon Mfg. Agents ..... CApitol 6-3971
Denver: Strong & Humphrey ..... SH 4-1351
San Francisco:
Electrical Sales Co. ..... EXbrook 7-2087

Electro-Motive Div., General Motors Corp. 54, 55
San Francisco ..... EXbrook 2-3546

Fanner Mfg. Co. 85, 86
Sold through Line Material Industries in following cities:
San Francisco ..... PLaza 5-8600
Los Angeles ..... RAymond 3-6251
Phoenix: J. E. Redmond Supply ..... ALpine 4-8471
Sacramento, Calif. ..... GI 2-6264
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Portland: A. L. Polich, Inc. ..... CApitol 3-6241
Seattle: A. L. Polich, Inc. ..... ATwater 3-7100
Albuquerque: Smith Sales Co. ..... AXtel 9-8024

Fullman Mfg. Co. 90
San Francisco: L. F. Church ..... UNderhill 1-2840
Los Angeles:
Payne & Sloan, Inc. ..... MAdison 4-7317
Denver: Kenneth B. Schumann Co. ..... AComa 2-8913
Bellevue, Wn.: R. C. English ..... GL 4-0566
Portland: Nelson English ..... CApitol 3-9814

Geigy Agricultural Chemicals 101
Div. of Geigy Chemical Corp.
Los Angeles ..... ANgelus 3-3855
Portland ..... CApitol 7-4167

General Electric Co. 89
San Francisco ..... DOuglas 2-3740
Los Angeles ..... MAdison 5-7381
Phoenix ..... ALpine 8-7724
Denver ..... KEystone 4-7171
Boise 4-3021
Salt Lake City ..... EMpire 4-1891
Portland ..... ATwater 8-0281
Seattle ..... MAin 4-8300

Graybar Electric Co. Inc. 16, 17
San Francisco ..... MArket 1-5131
Los Angeles ..... ANgelus 3-7282
Phoenix ..... ALpine 2-2371
Denver ..... TAbor 5-7111
Boise ..... BOise 3-2594
Butte ..... BUtte 3233
Portland ..... ATlantic 8-5661
Seattle ..... MUtual 2-0123
Salt Lake City ..... ELgin 9-8771
Spokane ..... FAirfax 7-6611
Tacoma ..... MArket 7-0164
San Diego ..... BEImont 3-1361
Tucson ..... MAin 2-6439
Sales offices in following cities: Bakersfield, Fresno, Long Beach, San Jose, Oakland, Oceanside, Sacramento, San Bernardino, Santa Ana, Santa Barbara, Van Nuys, Calif.; Colorado Springs, Colo., and Eugene, Ore.

Holan Corp. 15
Albuquerque ..... DIamond 4-3444
Phoenix ..... APplegate 8-6256
Denver ..... CHerry 4-8671
San Jose, Calif. ..... DRexel 9-2273

Hubbell, Inc., Harvey 94
San Francisco ..... MIssion 7-3240
Los Angeles ..... CApitol 3-1167
Denver: Paul A. Douden ..... KEystone 4-6798
Spokane: Elmer Johnson ..... MAin 2518
Seattle: Frank A. Strohecker ..... MAin 3-0357
Portland: David King ..... CApitol 8-1990

Indiana Steel & Wire Co., Inc. 95
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I-T-E Circuit Breaker Co., BullDog Electric Products Div
(See BullDog listing)

Kearney Corp., James R. 9
Branch Offices:
Emeryville, Calif. ..... OLympic 5-4091
La Canada, Calif. ..... MUrray 1-1026 and SYlvan 0-2933
Portland, Ore. ..... CHerry 4-5381
Salt Lake City:
Salt Lake City: Conely Engineering Co. ..... EMpire 3-5013
Golden, Colo.: Robert C. Smith ..... CRestview 9-5279

Kerite Co. 96
Oakland: C. E. Ingalls & Sons ..... OLympic 8-5622
Glendale, Calif. ..... CHapman 5-3721
Seattle: Fred Carlson ..... ATwater 4-4360

Lapp Insulator Co., Inc. 12, 13
San Francisco: Donald E. Ingalls ..... JUneau 6-0332
Los Angeles: Earl S. Condon & Co. ..... DUnkirk 1-3951
Seattle: Charles F. James ..... MAdison 3-1531
Salt Lake City: Riter Engineering Co. ..... EMpire 3-7933
Butte: R. E. McDonough Co. 2-5447

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San Francisco ..... PLaza 5-8600
Los Angeles ..... RAymond 3-6251
Portland ..... CApitol 2-1981
Seattle ..... ATwater 3-6368
Spokane ..... KEystone 5-2461
Salt Lake City ..... ELgin 5-6257
Phoenix: J. E. Redmond Supply ..... ALpine 4-8471
Boise ..... Phone: 2-5706
Butte ..... Phone: 8340
Denver ..... FL 5-1689 and 1680
Sacramento, Calif. ..... GI 2-6264
Anchorage (Spenard) Alaska ..... FA 2-2649

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San Francisco ..... UNderhill 1-7313
Seattle ..... MAin 3-1957
Portland ..... CApitol 3-5127
Phoenix ..... ALpine 2-1245
Salt Lake City ..... EMpire 3-2084

Midwest Piping Div. of Crane Co. 19
Los Angeles ..... Angelus 8-6733

National Supply Div. 14
Armco Steel Corp.
San Francisco: Egbert & Assoc. ..... DOuglas 2-2975
Los Angeles: Murphy-Hain ..... ANgelus 8-3521
Denver: Fred E. Staible & Sons ..... TAbor 5-3991
Salt Lake City:
Fred E. Staible & Sons ..... INgersol 6-2461
Seattle: Northwestern Agency Inc. ..... MAin 3-8882
Honolulu:
Hugh L. Bargion Co. ..... Honolulu 6-8846

Newport News Shipbuilding & Dry Dock Co. 8

Pacific Gas and Electric Co. 26
San Francisco ..... SUtter 1-4211

Paragon Electric Co. 98
Los Angeles ..... AN 8-3895
San Francisco: McCune-Western, Inc. ..... YU 6-1006
Denver: Roy J. O'Donnell Co. ..... KE 4-0179
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(Continued on page 105)

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INDEX TO ADVERTISERS

(Continued from page 100)

Petersen Engineering Co. **93**
(Contact factory for nearest dealer)
Santa Clara, Calif. ..... AX 6-7712

Phelps Dodge Copper Products Corp. .. **28, 29**
San Francisco ..... OXford 7-7333
Los Angeles ..... RAymond 3-1311 and PArkview 1-1191
Seattle ..... GLencourt 4-5026
Denver ..... CHerry 4-9291 and CHerry 4-9292
Portland ..... CApitol 6-6117

Porta House **99**
Los Angeles ..... LUdlow 3-1301
Oakland ..... OLympic 2-7237
Sacramento: Robert Cronin .... GIlbert 3-8543
Portland: Berdi Gen. Contractors ..... PRospect 5-4354
Los Angeles: Constructors Supply Co. ..... LUdlow 3-4171
Santa Ana: Blystone Equip. Co. Kimberly 2-3918

H. K. Porter Co., Inc.,
Delta Star Elec. Div. ..... **4th Cover**
Belmont, Calif. ..... LYtel 1-4461
Albuquerque: Ralph B. Black .. ALpine 5-9625
Denver: Electrical Agencies Co. 777-3003
Los Angeles ..... RAymond 3-0393
Phoenix:
Daley Elec. Sales Co. Inc. ALpine 4-4176
Salt Lake City:
Stevens Sales Co. ..... INgersol 7-5489
San Francisco ..... EXbrook 2-2588
Seattle ..... MAin 4-7066
Tucson:
Daley Elec. Sales Co. Inc. ..... MAin 4-6943

R T & E Corp. **18**
Richmond, Calif. (maintenance only) ..... BEacon 3-1686
Portland ..... MErcury 9-2161
Medford: H. L. Mooney ..... SPring 2-9948
Pasadena: D. B. Cole ..... SYlvan 0-5977
Salt Lake City: T. R. Van Wagoner Co. ..... INgersol 6-2461
Bellevue, Wn.: K. H. DuBois SHerwood 6-4114
Billings: W. L. Lassen ..... ALpine 9-9306
Anchorage: J. P. Bagoy ..... BRoadway 7-8011

Reliable Electric Co. ..... **2nd Cover**
Palo Alto, Calif.: D. B. Evans DAvenport 5-0230
Los Angeles: H. C. Mitchell, Jr GRanite 8-3418
Seattle: Don Miksch ..... LA 4-1273

Rome Cable Div. of Alcoa **27**
Los Angeles ..... HUntley 2-2475
San Francisco ..... JUno 8-1584
Seattle ..... MAin 4-4040
Salt Lake City ..... ELgin 9-8811
Denver ..... KEystone 4-0533
Phoenix ..... ALpine 4-9248

Royal Electric Corp. **92**
Los Angeles: Eckert-Lloyd Co. RIchmond 7-9652
San Francisco: Eckert-Lloyd Co. HEmlock 1-5792
Seattle: Northwestern Agencies ..... MAin 3-8882
Portland: Northwestern Agencies CApitol 7-0434
Phoenix: Wm. Benndorf ..... CRestwood 7-1662
Denver: Strong & Humphrey ..... SH 4-1351

S & C Electric Co. **80, 81**
Burlingame, Calif. ..... OXford 7-1131
El Monte, Calif.: Randolph Industries, Inc. ..... CUmberland 3-4183 and 3-7901 GIlbert 3-1701
Phoenix: Randolph Industries, Inc. 254-6491
Albuquerque:
Randolph Industries, Inc. 265-7563
Salt Lake City:
Riter Engineering ..... INgersoll 7-9449
Portland: S&C Elec. Co. ..... BElmont 4-5388

Sangamo Electric Co. **6**
San Francisco: L. A. Nott .... HEmlock 1-4738
Los Angeles: (Factory Sales) .... DUnkirk 7-2336
(Time Switches) ..... ANgelus 8-6771
Seattle: T. R. Wood ..... MAin 3-8204
Denver: Mt. States Machinery .. CHerry 4-7421
Phoenix: J. E. Redmond Co. .... ALpine 4-8471
Portland: R. L. Schoenberger ... CApitol 3-8742
Butte: R. E. McDonough ..... Butte 2-5447
Tucson ..... AXtel 8-4801
Albuquerque:
Gorman Engineering ..... CHapel 7-1596
El Paso: Gorman Engineering KEystone 2-3449
Anchorage, Alaska: John P. Bagoy ... BR 4-1884

Southern California Edison Co. **53**
Los Angeles ..... MAdison 4-7111

Southern States Equipment Corp. **50, 51**
Seattle: Jos. C. Platt ..... MAin 3-6141
Salt Lake City:
T. R. Van Wagoner Co. ..... HUnter 6-7251
Denver: R. T. Lewis Co. ..... EAst 2-1082
Los Angeles:
Matzinger-Johnson Co. ..... MAdison 4-8001
Lake Grove, Ore.: C. F. Selby NEptune 6-6442
Oakland: John H. Ormond ... TWinoaks 3-3235

Victor Specialties, Inc. **90**
San Francisco:
Stanley Sales Corp. ..... UNderhill 3-8900
Los Angeles: Hayjax Co. ..... MAdison 8-5256
Phoenix: George W. Hill ..... WH 6-1657
Salt Lake City: John E. Elggren AXtel 5-0472
Denver: Bacon's Elec'l Equip. ..... CH 4-6563

Weld Rite Co. .....
Oakland ..... ANdover 1-3341
San Gabriel, Calif. ..... CUmberland 3-9197
Bruce Emmett Co. in following cities:
Portland ..... BElmont 2-8117
Seattle ..... MUtual 2-6737
Spokane ..... WA 6-6352
Salt Lake City ..... ELgin 9-8577
Honolulu:
National Elec'l Supply .... Honolulu 9-2091

Western Insulated Wire Co. **91**
Los Angeles ..... LUdlow 7-7103
San Francisco: Electrorep, Inc. .. MArket 6-0225
Seattle:
Associated Elec'l Agents ..... MUtual 2-5232
Albuquerque: John Carder ..... CHapel 2-3581
Salt Lake City:
T. R. Van Wagoner ..... HUnter 6-7251
Portland:
Associated Elec'l Agents ..... CApitol 7-5654

Westinghouse Electric Corp. .....
32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 66, 67
San Francisco ..... EXbrook 2-5353
Los Angeles ..... MAdison 6-3881
Denver ..... KEystone 4-8121
Phoenix ..... ALpine 8-8621
Salt Lake City ..... ELgin 5-3413
Seattle ..... MAin 2-0808
Portland ..... ATlantic 8-6311
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